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THIRD ANNUAL REPORT

OF THE

BOARD OF RAILROAD COMMISSIONERS.

JANUARY, 1872.

BOSTON:

WRIGHT & POTTER, STATE PRINTERS,

79 MILK STREET (CORNER OF FEDERAL).

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Commonwealth of Massachusetts.

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The Railroad Commissioners respectfully submit their Third Annual Report.

The painful circumstances connected with the catastrophe at the Revere station upon the Eastern Railroad on the 27th of August last, and the general interest thereby excited on the subject of railroad accidents, their causes and means of prevention, have made it convenient for the Commissioners to divide their present Report into three parts, which relate to :

1st. Matters of local or temporary interest, more particularly concerning the individual railroads of the Commonwealth, including the doings of the Commissioners during the past year and the consideration of matters which, by special order of the last legislature, were referred to the Board, with instructions to report thereon.

2d. The Revere collision, with a report of the action taken by the Commissioners in consequence of that catastrophe ; including an investigation into the subject of railroad accidents in general, their causes and means of prevention ; and

3d. Matters appertaining to the railroad system of the State in its larger material aspect ; including questions of fares and freights, and the general public policy towards the railroad corporations most likely to conduce to their interest and to that of the people of the Commonwealth at large.

PART I.

Sixty-eight enactments in all in relation to railroads and horse-railways, were passed by the legislature of 1871. Of these, fifteen were of the nature of general and fifty-three were special laws. Fifteen charters for the construction of new roads were granted, of which fourteen were railroads and one was a horse railway; and four old charters were revived. The following table supplies the material of forming a comparison between the legislation just referred to of 1871 and that of the five preceding years. (Table No. 1.)

It will be observed that during the last six legislative years no less than forty-nine general laws and Resolves have been passed in relation to the railroads of Massachusetts, besides two hundred and ninety-four laws of special application. Of these, sixty-three have been either Acts of incorporation or of revival. As nearly as the Commissioners can ascertain from very defective returns, there were constructed, during the six railroad years terminating on the 30th day of September, 1871, $209\frac{23}{100}$ miles of railroad in the entire State.

THE GENERAL RAILROAD LAW.

The opinion of the Commissioners on the expediency of passing a general law authorizing the construction of railroads under suitable and very stringent limitations and restrictions, is too well known to make it necessary to dwell upon the subject here. In accordance with the recommendations contained in their previous reports (Report 1870,—Pub. Doc. No. 40, pp. 44–6; Report 1871,—Pub. Doc. No. 35, pp. 6–8), a bill upon this subject was prepared by the Committee on Railways for 1871, and submitted in the house of representatives, where it was defeated after considerable debate. This bill was very carefully matured by the committee, but differed in very many material respects from the measure suggested by the Commissioners; it was much more restricted in its operation and made no provisions as regards several matters which it seemed to the Commissioners desirable to provide for. The bill of 1871 was essentially, therefore, the measure of the Committee on Railways and not of this Board, although its

TABLE No. 1.

	RAILROADS.							HORSE RAILWAYS.					
	Gen. Laws.	Acts of Incorporation.	Acts of Re-vival.	Other Special Laws.	Total Special Laws.	Resolves.	Total Enactments.	Gen. Laws.	Acts of Incorporation.	Acts of Re-vival.	Other Special Laws.	Total Special Laws.	Total Enactments.
1866,	1	4	1	28	33	2	36	—	3	—	5	8	8
1867,	4	9	—	33	42	—	46	1	2	—	10	10	11
1868,	4	6	—	38	44	—	48	—	8	—	10	18	18
1869,	6	13	2	69	84	—	90	1	3	—	7	10	11
1870,	8	9	4	37	50	5	63	—	5	1	7	13	13
1871,	14	14	1	26	41	5	60	1	1	3	3	7	8
	37	55	8	231	294	12	343	3	22	4	42	66	69
Average each year,	6.5	9.17	1.3	38.5	49	2	57.1	.5	3.66	.66	7	11	11.5

defeat was a source of regret to all of its members. Meanwhile, it is wholly unnecessary for the Commissioners to repeat their recommendations on this subject. Since their previous reports were made, nothing has occurred which has induced them to alter the opinions heretofore expressed, and the passage of a general railroad law in Connecticut, in June last, has served to confirm them. At the same time the Commissioners feel called upon to add that, in their opinion, though the passage of a general railroad law, regulating the organization of companies and the construction of roads, would be a measure of great utility, it would, in itself alone, by no means accomplish all that is sometimes expected of it. It is only a step, though a very important one. The end which should be kept in view is the entire regulation of the whole railroad system, in so far as it is regulated at all by statute, by general laws only; the name of any particular road should never appear in an Act of legislature. The enactment of a law of the nature of that suggested will mark a great advance towards this final result, which can only be attained through the experience and discussions of a number of years. That it will ultimately be generally attained, however, may, in the light of the recent experience of other States, confidently be expected. Meanwhile, the Commissioners have no disposition on this subject to recommend the trial, in Massachusetts, of any dangerous or even novel experiment in legislation.

Even a superficial analysis of the legislation of any given period, such as the six years contained in Table No. 1, discloses a great number of matters, once subjects of special legislation and calling for many annual enactments, which have since been provided for by general laws and have disappeared from the more recent statute books: Such, for instance, as the right of one railroad corporation to enter upon and use the road of another; provisions for the safety of travellers at particular grade crossings; and the authorization of towns to subscribe to the stock of new enterprises. Notwithstanding these reforms, however, the mass of special railroad legislation tends steadily to increase, and it is a notorious fact that it is now almost impossible to say what the exact position or rights of any given railroad corporation are; in some cases these depend on the construction of a hundred special

laws. The matters provided for in these laws are multifarious. At a late day, in the preparation of this Report, the Commissioners attempted to make a thorough analysis of the special Acts relating to railroads passed since the year 1860, but they found that they contained provisions relating to between 1,000 and 1,500 matters of detail; and the work rapidly assumed proportions of such magnitude that it had, necessarily, to be abandoned. The following were found to be the more frequent causes of legislation, and those most readily admitting of disposition under general laws:—Acts of incorporation, of revival, and for extension of time for construction; authority to extend road, to build branches, to change name or location, to increase or reduce capital, to sell franchise, to sell, lease or mortgage road, to issue bonds, to take land, to lay additional tracks; the union or consolidation of roads; the change of location of stations; contracts between corporations to enable one to aid in the construction of another.

This list might be largely extended, but it is unnecessary to do so. The statute books, especially the later ones, are full of special laws under each of the heads above given. A careful examination of it could hardly fail to satisfy even the most prejudiced, of the pressing need, in this respect, of an immediate and radical reform.

RAILROAD CONSTRUCTION DURING THE YEAR.

The year 1871 was a peculiarly active one as regards railroad construction in Massachusetts, and $130\frac{6.0}{100}$ miles of road were reported to the Commissioners as put in operation between September 30th, 1870, and the same date of 1871. It is a noticeable fact and one singularly illustrative of the inaccuracy of the returns hitherto made of the railroads of this State, that it is now wholly impossible to ascertain with precision how many miles of railroad there were in Massachusetts at the close of any railroad year anterior to the present one. No rule was enforced. Some corporations reported their entire mileage both within and without the State; others, only that within the State; and others, again, reported differently in different years. Judging by the official figures it would appear that sometimes the railroad mileage of the State has increased and that sometimes it has diminished, but that its

growth has been subject to no law. As a result of this, the State returns have not infrequently led the most experienced railroad officials to most inaccurate conclusions and have caused them to express opinions which would not bear criticism. This is one point which the Commissioners have this year attempted to clear from all doubt in the amended form of returns herewith submitted. From these it would appear that at the beginning of the railroad year for 1870-1, there were, in Massachusetts, $1,230\frac{41}{100}$ miles of main road, and $244\frac{76}{100}$ miles of branches; $457\frac{81}{100}$ miles of double track, and $346\frac{96}{100}$ miles of siding; being, in all, $1,475\frac{17}{100}$ miles of railroad, and $2,278\frac{94}{100}$ miles of railroad track. The additional amount opened for traffic during the past year increases this aggregate to $1,605\frac{77}{100}$ miles of railroad in operation; being one mile of road to each $4\frac{86}{100}$ square miles of territory and to every 907 inhabitants.

INSPECTION OF ROADS.

Owing to the fact of a vacancy existing in the Board from the 1st of July to the 28th of November, and that neither of the remaining members of it were competent to pass upon questions of engineering skill, the usual inspection of roads was, in great degree, deferred until the lateness of the season and the extreme pressure of other business rendered it impracticable. In certain cases defects in construction or in maintenance of way were brought to the notice of the Commissioners, either through the public press or private communications. In every such case a competent engineer was at once sent to examine the alleged defect, and his report in writing was, if the occasion required it, forwarded, with recommendations of the Commissioners, to the corporations.

Most of the roads constructed and opened to traffic during the year have been visited and carefully inspected by the Commissioners, and reports upon certain of them, enumerated below, will be found appended to this Report (Appendix A):—

The Athol & Enfield Railroad.

Boston, Barre & Gardner Railroad.

Duxbury & Cohasset Railroad.

Framingham & Lowell Railroad.

Granite Branch Railroad.

COMPLAINTS AND PETITIONS.

A large number of matters have been brought before the Board on the complaints or petitions of private parties during the last railroad year, and quite a number more are now pending, awaiting the action of the Board. A portion of these were satisfactorily arranged through the intercession of the Commissioners, without the necessity of any formal hearing, and the petitions were withdrawn. The law establishing this Board requires it, in all cases where a hearing has been had, to inform the corporation of the improvements and changes which it adjudges to be proper, and provides that "a report of the proceedings shall be included in the annual report of the Commissioners to the legislature."

Hearings were had or reports prepared by the Board in the following cases:—

1. On the petition of C. Green and others, of Woburn, in relation to the stopping of the 6 o'clock P. M. train on the Boston & Lowell Railroad. Heard December 20, 1870. A report of the proceedings will be found in Appendix B of this Report.

2. On the petition of Saul B. Scott and others, for a change of location of the City Mills Depot on the Boston, Hartford & Erie Railroad. Heard 31st January, 1871. A report of the proceedings will be found in Leg. Doc's, 1871,—Senate No. 56.

3. On the petition of Charles Hamant and others of Medfield, for a change of location of the depot of the Boston, Hartford & Erie Railroad at that place. Heard on 7th February, 1871. A report of the proceedings in this case will be found in Appendix B of this Report.

4. On the petition of the Fitchburg Railroad Co., for authority to lay a side-track across a public highway in Watertown. Heard on 28th January, 1871. A report of the proceedings in this case will be found in Appendix B of this Report.

5. Petition of W. H. Davis and others, for a law compelling the construction of a new depot at the junction of the Boston, Hartford & Erie and the Norwich & Worcester Railroad Cos. in the town of Webster. Heard 9th February, 1871. A report of the proceedings in this case will be found in Leg. Doc's, 1871,—House, No. 229.

6. On the petition of Thomas M. Hopkinson and others, relative to the price of season tickets between Groveland and

Haverhill on the Boston & Maine Railroad. Heard 25th February, 1871. A report of the proceedings in this case will be found in Appendix B of this Report.

7. On the petition of D. B. Wingate and others, of Natick, for a change in the location of the passenger depot of the Boston & Albany Railroad in that town. Heard 16th and 20th March, 1871. A report of the proceedings in that case will be found in Leg. Doc's, 1871,—Senate, No. 256.

8. On the order of the legislature, relative to the expediency of legislating on the subject of smoke and spark-consuming fixtures on locomotives. A report in this case will be found in Leg. Doc's, 1871,—House, No. 381.

9. On the petition of the Holyoke Water Power Co., that the Board examine the location of the Holyoke & Westfield Railroad Co. in Westfield. Heard on 12th May, 1871. A report of the proceedings in this case will be found in Appendix B of this Report.

10. On the complaint of the selectmen of the town of Sharon, for early and late trains on the Boston & Providence Railroad between Boston and that town. Heard on 7th, 13th and 20th July, 1871. A report of the proceedings in this case will be found in Appendix B of this Report.

11. On a communication of D. L. Harris, in relation to the location of track of the Mt. Tom & Easthampton Railroad in the town of Easthampton. Locality examined on 20th September, 1871. A report of the proceedings in this case will be found in Appendix B of this Report.

In all of the above cases, except the last, in which a mere statement of facts was made, the findings and recommendations of the Commissioners were either accepted as conclusive by the parties, or were affirmed, on appeal, by legislative action. A large number of other matters were also brought to the attention of the Board, besides such petitions as were satisfactorily disposed of without the necessity of a formal hearing. Certain of these involved questions of engineering skill, and the safety of bridges and other parts of the permanent way. As, for reasons already given, between the 1st of July and the 28th of November, no member of the Board was qualified to pass upon questions of this sort, all such, when they arose, were immedi-

ately referred to Mr. E. S. Philbrick, by whose written reports the Board was guided in its action.

Two other subjects of general interest, though not coming before the Board through a complaint or petition, can most conveniently be referred to in this connection. One of these related to a recent new issue of capital stock by the Boston & Maine Railroad Co., under authority of an Act of the legislature of the State of Maine; the other, to improved depot accommodations in Boston for the passenger traffic of the Boston & Providence and the Boston & Albany Railroad Cos.

INCREASE OF CAPITAL BY THE BOSTON & MAINE R. R. Co.

At a stockholders' meeting of the Boston and Maine Railroad Co., held at Berwick Junction, in the State of Maine, on the 13th day of December last, the following votes were passed:—

“ Voted, That the directors of the Boston & Maine Railroad be authorized to increase the capital stock of said corporation, by a sum not exceeding \$2,000,000 over and above the amount of its capital heretofore authorized, to defray the expenses of the construction of the extension of their road to Portland; said two million dollars being authorized by the legislature of the State of Maine, for the purpose of building the extension into Portland, as per Act of said legislature, approved February 17, 1871; and to divide the same into shares of one hundred dollars each, and to issue its stock for such amount thereof as they shall deem necessary for the interest of the corporation.

“ Voted, That the stockholders shall have the right to subscribe for the stock so issued in proportion to the amount of stock held by them at the time of such subscriptions, and pay for them in such instalments as the directors may order: *provided,* that notice shall be given to the treasurer of their election to take the same, on or before such date as the directors may order.”

Both the matter of the increase of the capital stock of railroad corporations and the manner in which such increase, where authorized, should be made, were provided for by Acts of legislature of 1871 (Acts 1871, chapters 389, 392). By the first of these, it was provided that any railroad corporation owning a railroad in this Commonwealth, and consolidated with a corporation in another State, owning a railroad therein,

which should extend its line of road or increase its capital stock or the capital stock of the consolidated corporation, without the authority of the legislature of this Commonwealth, should thereby render its charter and franchise subject to forfeiture. It was specially provided, however, in a saving clause of this Act, that nothing in it contained should "be construed to prohibit the Boston & Maine Railroad Co. from extending its railroad to Portland, in the State of Maine, under the authority granted by the legislature of said State." The other Act referred to, chapter 392, was general in its terms, and provided that "a railroad corporation authorized to increase its capital stock, or to issue additional shares of stock for any purpose, shall, if the cash market value of its shares exceeds the par value thereof," sell such additional stock, in the method prescribed in the Act, at public auction, in the city of Boston; and should further issue only such number of shares as would, when so sold at auction, produce the amount necessary to carry out the object for which the issue was authorized.

The laws defining the duties of this Board provide, that whenever, in the judgment of the Commissioners, it shall appear that any railroad corporation fails, in any respect or particular, to comply with the laws of the Commonwealth, they shall forthwith present the facts to the attorney-general, who shall take such proceedings thereon as he may deem expedient (Acts 1869, ch. 408, § 3; 1870, ch. 307, § 5). In the present case, it seemed to the Commissioners a doubtful question whether the saving clause in chapter 389 of the Acts of 1871 authorized any issue of stock at all by the Boston & Maine Railroad; and if it did, it was further questionable whether such stock could be issued and disposed of, except in the manner prescribed by chapter 392, viz.: by sale at public auction. The following communication was accordingly addressed to the attorney-general:—

RAILROAD COMMISSIONERS' OFFICE, BOSTON, Dec. 21, 1871.

Hon. CHARLES ALLEN, *Attorney-General*, &c.

MY DEAR SIR:—I am directed by vote of the Board of Railroad Commissioners to call your attention officially to the votes recently passed at a meeting of the stockholders of the Boston & Maine Railroad in relation to an increase of the capital stock of that company.

The meeting was held at Berwick Junction, in the State of Maine, on the 13th inst. I enclose you a copy of the votes passed thereat authorizing an issue of 20,000 shares of capital stock of the company to stockholders at the par value of the same (\$100). The stock was then selling in the market for \$144.25 per share.

This action was taken in the State of Maine, and under authority conferred by an Act of the legislature of that State.

In this connection I would call your attention to chapters 389 and 392 of the Acts of 1871. The extension of road provided for in the votes of the meeting of the 13th inst. was expressly excepted from the operation of chapter 389 by the final clause of that Act. No such exception was made in the case of chapter 392. The provisions of this Act cover the case of the Boston & Maine Railroad, and I am not aware of any special Act of the legislature limiting the operation of the general law.

The Acts consolidating into one corporation the several roads in Massachusetts, New Hampshire and Maine, forming the Boston & Maine Railroad, are as follows: Acts 1841, chap. 56; Acts 1843, chap. 90; Acts 1845, chap. 159.

The point I am directed to submit to you is the following:—Can a railroad corporation owning a railroad in this State, and consolidated with a corporation in another State owning a railroad therein, issue, under authority of an Act of legislature of such other State, shares of capital stock of the consolidated road except in the manner provided in chapter 392 of the Acts of 1871?

In conclusion, I wish to call your attention to section 5 of chapter 307 of the Acts of 1870, prescribing the duties of this Board in cases of the violation of the law by railroad corporations. You will observe that such legal action is to be taken as the Attorney-General may deem expedient.

I remain yours, &c.,

CHARLES F. ADAMS, Jr.,

Railroad Commissioner.

The case was immediately brought before the supreme judicial court on an information by the attorney-general praying that an injunction might issue, restraining the Boston and Maine Railroad Company from any issue of new capital stock in the mode prescribed by the vote passed at the corporation meeting of December 13th. The case was argued at length before the full bench on the 6th of January, and the following rescript was entered on the 8th:—

“By the statute of Maine, approved February 17, 1871, the Boston & Maine Railroad was authorized to extend its railway from Berwick to Portland, and, for that purpose, to increase its capital stock and issue new shares. According to the laws of Maine, it was authorized under this Act to issue the new stock in the manner provided in the vote set forth in the information. After the defendant had obtained this authority, the legislature of Massachusetts passed the two statutes upon which this information is founded, being chapters 389 and 392 of the Acts of 1871. Both were approved the same day. The first Act (chapter 389), among other things, prohibits any railroad corporation in this State, which is consolidated with a corporation in another State, from extending its road or increasing its capital stock without the authority of the legislature of this Commonwealth, under the penalty of rendering its charter and franchise liable to forfeiture; but it contains the express proviso that ‘nothing herein contained shall be construed to prohibit the Boston & Maine Railroad from extending its railroad to Portland, in the state of Maine, under the authority granted by the legislature of the said state.’ This proviso exempts the defendant corporation from the operation of the Act, so far as regards the extension of its road and the increase of its capital for that purpose, and as incidental thereto, according to the authority of the statute of Maine. Chapter 392, which provides ‘that a railroad corporation authorized to increase its capital stock,’ shall sell the new stock at auction in the city of Boston, appears to have been intended to apply only to corporations authorized by the legislature of this Commonwealth to issue new stock. If it be admitted that it was intended to apply, not only to corporations whose roads are wholly within this State, but also to such consolidated corporations as obtain authority of our legislature under chapter 389, it does not reach this case. The exemption of the defendant from the operation of chapter 389 takes it out of chapter 392. It is not within the terms of the last-named statute. By the joint construction of both statutes, it appears that it was the intention of the legislature to exempt the Boston & Maine Railroad from their operation so far as the proposed extension to Portland is concerned, and to sanction such extension under and in the mode provided by the statute of legislature of Maine. It follows that the action of the defendant corporation which is complained of was legal, and that this information must be dismissed.”

It will be seen that the saving clause in chapter 389 of the Acts of 1871 was construed as taking the Boston & Maine

Railroad Company, so far as the extension of its road to Portland was concerned, wholly out of the operation of the Massachusetts laws, and as referring the corporation to the laws of Maine as to its rights and obligations in this respect.

THE OPERATION OF CHAPTER 392 OF ACTS OF 1871.

Before passing from this subject the commissioners wish to call attention to certain features in the practical operation of chapter 392 of the Acts of 1871, which seem to threaten results not contemplated in the passing of the Act. The object had in view in passing that Act was very apparent: it was to cause the full market value, being not less than par, of any issue of new capital stock of railroad corporations, to be paid into the treasury of the corporations, instead of the par value only of the stock as provided in chapter 179 of the Acts of 1870; the object being to keep down the amount of dividend-bearing stock of railroad companies to the lowest point consistent with the production of the amount of money necessary to accomplish any purpose. The new issues of stock were held to carry a right to their proportion of the enhanced value of the corporation property; this enhanced value the Act provided should become a matter of sale and cease to be an incident. In this respect the law was a reversal of the long-established policy of the Commonwealth as regards its railroad corporations. The theory of our legislation hitherto has been that the State needed both new railroads and the most complete development of all old railroads; the full accomplishment of both objects require large investments of private capital, upon which the Commonwealth guaranteed no certain return, but it authorized a return not exceeding ten per cent. per annum, if as much could be earned; in other words, a possible return of ten per cent. was held out to induce private capital to enter into railroad enterprises; and this amount, if it could be earned, the law declared the community willing to pay. There is not a railroad in Massachusetts of any general importance which does not now stand in urgent need of additional large outlays to accommodate the growing business wants of the community. Especially is this the case with the lines terminating in Boston, without any exception; the growth of the community imperatively calls for liberal outlays on the part of all of them. The former

policy of the Commonwealth, by holding out a prospect of ten per cent. dividends on the new capital necessary to effect these needed developments, offered a strong inducement to the stockholders of the corporations to adopt a liberal policy and to go energetically forward with it. The Act of 1871, in its practical operation, cuts off this inducement by limiting the return of new capital invested in the development of all the leading lines of the State, not at ten per cent. but at ten dollars per annum on the market value of the stock of such companies, thus reducing the return on new capital from ten to eight and even seven per cent. Less inducement is thus held out to private capital to seek investment in the railroad system of Massachusetts than in any other State of the Union. In all of these, the law authorizes a possible return of ten per cent. as a minimum, and in many the limit is fixed much higher. It is, therefore, matter of consideration whether the Act under discussion, by reducing the possible return to so low a point, will not cause those managing the corporations to become indifferent to a further development, which cannot accrue to their own advantage, and to divert their capital to other quarters where it will be more liberally remunerated.

It is unnecessary for the Commissioners to add, that while the law in question is on the statute book, it will be rigidly enforced, in so far as it falls within their province to enforce it. They did all which lay in their power in this respect in the case of the Boston & Maine Railroad Company, and they will do no less should any similar case arise.

THE PASSENGER STATIONS OF THE BOSTON AND ALBANY AND THE BOSTON AND PROVIDENCE RAILROAD COMPANIES IN BOSTON.

Much public interest has been felt in the question of the relocation, now become inevitable, of the passenger stations of the Boston & Providence and of the Boston & Albany roads in Boston. The matter has not been in any way brought directly to the attention of this Board, nor have its numbers given that thorough consideration to the subject which would enable them to express any opinion upon it which would be entitled to weight. Certain facts, however, in connection with the relocation of the passenger stations of these two railroads are matters of general notoriety. Here are two roads, daily sending in and

out of Boston no less than 111 passenger trains, in which are carried an average aggregate of 15,000 persons. The decision which must soon be arrived at involves the question how these passengers are to have ingress to and egress from the city during the next thirty years, at the expiration of which time their number will probably have increased to at least 50,000. At present, in approaching Boston, the tracks of the two companies cross each other at grade, in a way at once both dangerous and inconvenient, and, under any new arrangement hitherto suggested, not only is the existing grade crossing to be perpetuated throughout the life-time of another generation of travellers, but it seems to be conceded that in the case of both roads the points of delivery are to be pushed further away from business centres. Such a result may in this case be inevitable. The Commissioners are not prepared to say that it is not. At the same time, it is certainly opposed to the whole tendency of modern metropolitan transportation, which always strives, instead of discharging travellers at a greater distance from business centres, to overcome that distance by means of greater outlay, and to concentrate delivery at the most convenient points. The solution of this problem has been more successfully effected in London, both under greater difficulties and at heavier outlay, than anywhere else in the world. In that city, two railroads, running, the one underground and the other over the roofs of houses, connecting with almost the whole railroad system of Great Britain, deliver passengers as near to the Bank of England and the Royal Exchange* as Pemberton Square is to the Boston post-office. These roads were constructed at an expense of many millions of dollars, and during the busier hours of the day they are traversed by trains at intervals of from two to five minutes. The Commissioners do not wish to be understood as suggesting the expediency of any such outlay in Boston. It is neither feasible nor, at this time, required. They refer to it only as illustrating the tendency of civilization to overcome distance rather than to increase it. The present case does not involve the whole of this question. It looks simply to the possibility of these two corporations effecting that in combination which to either, separately, would be impracticable, and to thus paving the way to such further development as the experience of the past clearly

indicates will in time be demanded of them. The present object of the Commissioners is simply to call the attention of the legislature to the subject. They have themselves, at this time, neither specific recommendation to make nor plan to propose in regard to it. Anything of the sort should only be based on the most careful and thorough investigation and reflection.

THE EXPRESS BUSINESS.

In both of their previous reports the Commissioners took occasion to recommend as strongly as they could the assumption by the several companies of the local express or "parcels delivery" business along the line of their roads (Report 1870, pp. 66-75; Report 1871, pp. 20-1). And a year ago they expressed their great regret that nothing, in this respect, had resulted from the voluntary action of the companies. The efforts of the Commissioners in this direction have been unremitting, and early in the present year they addressed communications upon it to the leading officials of certain of the corporations which seemed most favorably inclined to the experiment. Not meeting with any great degree of encouragement, they, in May last, applied to the State Directors of the Boston & Albany Railroad, and sought to interest them in the scheme. Here, at last, they were successful, and, through the active coöperation of these gentlemen, a communication of the Commissioners on the subject was brought before the board of directors of that road in such a way as to insure some decisive action upon it.

In this connection, the Commissioners would like to express their sense of the very efficient aid and coöperation which they have received from these gentlemen, not only as regards this, but many other matters. Their presence in the direction of the leading road of the Commonwealth, representing the public, has given to this Board a means of approaching and influencing the policy of that company which they have not enjoyed elsewhere. In other quarters the suggestions of the Commissioners have been courteously received and a consideration of them has been promised, while by the State Directors of the Boston & Albany road they have been both received and definitely acted upon. In this matter of the assumption

of the express business the Commissioners were peculiarly indebted to the active coöperation of the Hon. Stephen M. Crosby, who was chairman of the committee of directors to whom their communication was referred, and who drew up the report upon which final action was had.

This action insures the fair trial of an important experiment, which, if successful and fully developed, will extend the essential conveniences and facility of the post-office system over the whole field of smaller packages. A fair trial of it is all that can at this time be asked. The trial is to be made at once, and upon that portion of the Boston & Albany road known as the Worcester division. Should it prove a success there, its rapid development over the other railroads of the Commonwealth may be confidently expected, as several of them already have the subject under serious consideration.

REDUCTION OF FREIGHTS AND FARES.

Shortly after the adjournment of the last legislature, the Commissioners addressed a general circular to the several railroad corporations of the State on the subject of fares and freights, suggesting to them the propriety of revising their tariffs of charges, with a view to making such reductions in them as should seem to be feasible. This, and a subsequent circular on the same subject, will be found in Appendix C of this Report.

All of the replies to this circular containing any information of value are herewith submitted. It will be seen that, during the year more or less considerable reductions in fares or in freights, or in both, were made by the following corporations, owning almost all of the important lines of the State and operating exactly one-half of its entire mileage; viz.,—

The Boston & Albany Railroad Co.

Boston & Maine Railroad Co.

Cheshire Railroad Co.

Connecticut River Railroad Co.

Fitchburg Railroad Co.

New Bedford & Taunton Railroad Co.

New Haven & Northampton Railroad Co.

Old Colony & Newport Railway Co.

Providence & Worcester Railroad Co.

Vermont & Massachusetts Railroad Co.

Worcester & Nashua Railroad Co.

It is impossible to ascertain exactly the money value of these reductions, or the amount of relief which they afford to the community. As nearly as the Commissioners can estimate, they represent between \$100,000 and \$500,000 per annum. Neither does this amount include the reductions made on through business, which depends not upon fixed and permanent tariffs, but upon a competition between roads all of which may be in other States. Rates on this class of business ruled lower at times during the past summer than ever before; being, in fact, on westward-bound merchandise almost nominal. The circular of the Commissioners had no reference to this business.

The following were the answers received, and the Commissioners have taken the liberty of appending such remarks of their own as seemed necessary to their correct appreciation:—

OFFICE OF THE BOSTON AND ALBANY RAILROAD COMPANY, }
BOSTON, MASS., August 18, 1871. }

To the Hon. Board of Railroad Commissioners.

GENTLEMEN:—I communicated to you quite recently the action of the Directors of the B. & A. R. R. Co. in reducing the local passenger fares upon their road. Your familiarity with the whole subject is such that you will hardly require any explanation of the reasons for the precise manner and extent of the reduction; but there are a few facts which I have thought proper to bring to your notice.

Upon the consolidation of the Boston & Worcester and Western roads, in 1868, there was not that general revision of the passenger tariff of the two old roads which perhaps should have been made to equalize the rates and bring them into entire harmony and consistency upon the new road. The consequence was, that the fares upon the Boston & Worcester division, remaining substantially as they were before the consolidation, and the fares upon the extreme Western division, where they were controlled by the local law of the State of New York, continued lower than they were in the intermediate section, between Worcester and the State line. As for instance, the fare from Worcester to Ashland, going east 20 miles, was 65 cents; while going west to Brookfield, precisely the same distance, the fare was 85 cents. From the State Line to Chatham Centre, $20\frac{2}{3}$ miles, the fare is 65 cents; while from the same place to Hinsdale it is 85 cents, although the distance is $19\frac{1}{3}$ miles. And so generally of other places. The towns and villages within twenty or more miles of Boston have long had the benefit of low fares, especially in special trains, and their rapid growth shows the effect of it.

Now Worcester, Springfield and Pittsfield are the trade centres of the people living within ten or twenty miles of those places, as Boston is for all places at greater distances upon all the roads radiating from that city. I have not calculated the percentage of the reduction by the proposed tariff, upon the present fare, but I have little doubt that it will average from 20 to 25 per cent. upon the way travel between Worcester and Pittsfield and intermediate points; perhaps not quite that for the longer distances. While the new tariff equalizes fares upon all parts of the road, and will thus remove all cause for the complaints of unjust discrimination which we have heard from the interior and western part of the State, it will, I think, accomplish something of what your Board recommend in your circular of August 10, just received, viz., making a heavy reduction where it is most needed and will most tell in a probable increase of travel upon the road. I append a table showing the effect of the reduction upon a few places, taken at random, upon the line of the road.

I have the honor to be,

Very respectfully,

D. WALDO LINCOLN.

	Miles.	Present Fare.	Proposed Fare.	Reduction.
Worcester to Spencer, . . .	17 $\frac{60}{100}$	\$0 75	\$0 55	\$0 20
“ to Warren, . . .	28 $\frac{37}{100}$	1 10	80	30
“ to Springfield, . . .	54 $\frac{28}{100}$	1 85	1 55	30
Spencer to West Brookfield, . .	7 $\frac{79}{100}$	35	25	10
“ to Palmer, . . .	21 $\frac{74}{100}$	90	65	25
Wilbraham to Brimfield, . . .	9 $\frac{94}{100}$	45	30	15
Springfield to Chester, . . .	27 $\frac{75}{100}$	1 05	80	25
Chester to Hinsdale, . . .	15 $\frac{96}{100}$	70	50	20
State Line to Hinsdale, . . .	19 $\frac{91}{100}$	85	60	25
Newton to Westborough, . . .	25	80	70	10
Worcester to Boston, . . .	44 $\frac{10}{100}$	1 35	1 25	10
Boston to Pittsfield, . . .	150 $\frac{48}{100}$	4 75	4 25	50

Every town between Worcester and Springfield will save from 20 to 40 cents a trip to and from Boston.

BOSTON AND ALBANY RAILROAD CO., PRESIDENT'S OFFICE, }
 SPRINGFIELD, MASS., January 12, 1872. }

GENTLEMEN:—In answer to your circular of September 30th, I would say that the local passenger tariff of this road, in force up to the first of October last, was established in 1864, but it had been modified from time to time by issuing package and mileage tickets, thereby enabling the local travel to avail of very considerable reductions. The tariffs in connection with the western roads have undergone frequent changes, in consequence of the sharp competition for that business; but, as a general thing, they have been about eight per cent. below the regular rates.

A new passenger tariff was adopted on the first of October last, and has been in force since. It was estimated that this tariff, as applied to the business of 1871, would cause a loss of about \$140,000 in the passenger receipts. In comparing the business for the months of October, November and December for 1869, 1870 and 1871, we find these three months in 1870 show a gain of $13\frac{3}{10}$ per cent. over the same period in 1869, while for 1871 as compared with 1870, the loss is about \$2,000 per month, notwithstanding a large increase in the amount of work done.

The freight tariff now in force was issued February 1, 1868, and under its operation a large reduction in rates has been effected. On coal, lumber, glass, sand, pig-iron and live stock the rates have also been reduced since 1869 from 25 cents to \$1.20 per ton.

How far the gross receipts or net income of the road have been increased by these reductions in rates it is difficult to determine; certain it is that the gross amount of tonnage has increased in a much larger ratio than the net amount of receipts. It is believed, however, that the increased facilities for business have had a much more important bearing upon the large increase of tonnage than the reduction of rates.

Upon the special article of coal we have already made concessions, and we intend to watch the traffic in that article with special care. There are, however, in this business many things to be harmonized. For example: the coal business of the last season, whether necessarily or unnecessarily, was crowded into a few months, thereby greatly overtaxing the rolling stock adapted to its transportation, and causing heavy demurrages to that portion which was water-borne. The policy of the Boston & Albany road has been, and now is, to provide itself with means to do all the business which it can attract to its line, and do without loss. We believe that we are now working on that line, and that no essential reduction in existing rates can be made, and the present efficiency and

high standard of accommodation be maintained. Our expenditures are in the main for labor and materials, largely the former, for which we were never paying more than at the present time; nor can we expect it to be less while the high cost of living continues. Materials in use by railroads, also the product of labor, while subject to the present excessive taxation, cannot be had for less than at present. On the single article of steel rails, so desirable for every railroad, there exists a tariff tax of some \$3,000 for every mile improved by their use. When taxation, local, State and national, shall be reduced, the subject of reducing the rates of transportation may well be considered.

A comparison of the rates received for the transportation of freight ten years ago, when we were paying for labor less than two-thirds of what we are now paying, may not be out of place in this connection.

The average rate per ton per mile received by the Boston & Worcester and Western Railroads for all freight carried was,

In 1859, $3\frac{23}{100}$ cts. per ton per mile.

1860, $2\frac{79}{100}$ " " "

1861, $2\frac{59}{100}$ " " "

Average, $2\frac{7}{100}$ " " "

For the single year 1865 the rate was $3\frac{65}{100}$ cts.

In 1869, $2\frac{43}{100}$ cts. per ton per mile.

1870, $2\frac{19}{100}$ " " "

1871, $2\frac{9}{100}$ " " "

Averaging a fraction less than $2\frac{24}{100}$ cts.

Showing that the rate received by us for the last three years is 22 per cent. less than the rate for three years prior to the general rise consequent upon the war, and that too while we are paying for labor full sixty per cent. more than during the former period. I don't know what you will find in other roads, but if we are not "down on to hard pan," you can make figures tell a different story from what I can.

Very respectfully, yours,

C. W. CHAPIN, *Pres't.*

TO THE BOARD OF RAILROAD COMMISSIONERS.

The fact mentioned by the President and Vice-President of the Boston & Albany Railroad in the foregoing communications, that, upon the consolidation of the Boston & Worcester with the Western Railroad in 1868, no revision of the passenger tariffs of the two roads was effected in order to at least equalize

charges, but that until the 1st of October, 1871, the two parts of the consolidated road were still operated under the old local tariffs, affords a very striking illustration of the propriety of the revision suggested by the Commissioners. It was a source of great regret to the Commissioners that the reduction effected was not of a more decided nature,—a regret which is increased by the statement contained in the reply of the President of the road, that the immediate effect of the reduction, such as it was, was, through the increase of traffic, to reduce an estimated loss of \$12,000 per month to the almost nominal amount, under the circumstances, of \$2,000 per month. The full effect of these changes cannot, of course, be felt at once. Nine months of the first year of this experiment are yet to elapse, and it remains to be seen whether the estimated loss of \$140,000 in this case, will not, at the end of the railroad year, result in an unequivocal net gain.

In the case of the Boston & Albany road, before the present reduction was effected, the Commissioners made a strong effort, through the assistance of certain State Directors, to secure in the proposed revision a more decided recognition of the principle of a reduction of fares increasing according to the distance travelled. A passenger, for instance, who travels and occupies a seat through a distance of 150 miles can certainly be transported at less cost per mile by a railroad than one who occupies his seat for only ten miles, and then leaves it vacant. This principle is uniformly and decidedly recognized in the sale of season-tickets. On a road the length of the Boston & Albany, therefore, it would seem feasible to charge somewhat as follows:—For all distances not exceeding 20 miles, 3 cents per mile; for each mile over 20 and less than 50 miles, $2\frac{50}{100}$ cents additional, for each mile in excess of 50 miles, 2 cents per mile additional. It was thought that the effect of this decided reduction might be to largely increase the long travel, and consequently the most remunerative travel of the road, by drawing the western counties of the State much nearer to Boston, and holding out a certain inducement to the inhabitants of those sections to seek that centre over the Boston & Albany road, instead of going to New York over the Housatonic and Hartford & New Haven roads. The principle was in fact adopted, but only in a very modified degree, all distances over 20 miles being charged

for at the rate of 2.83 cents per mile instead of 3 cents. Why the fraction of $\frac{83}{100}$ was adopted the Commissioners are not advised.

So decided a reduction as that suggested by the Commissioners was perhaps premature, and in view of the facts stated in the above replies could not, possibly, now be ventured upon;—at the same time, should the revision of 1871 result in a financial success, there will be strong justification for urging upon the corporation a new and bolder step in the same direction.

The expediency of an early and decided reduction in the charges on the carriage of coal has also been made the subject of earnest recommendations addressed to the management of this company on the part of members of this Board. The above communications would seem to justify a hope that an early tariff revision in that respect may be anticipated.

BOSTON, CLINTON & FITCHBURG RAILROAD.

RATES OF TRANSPORTATION ON THE BOSTON, CLINTON AND FITCHBURG RAILROAD.

Passengers.

	Highest.	Lowest.
Rate per mile from station at Fitchburg,—	Cents.	Cents.
For the shortest distance passengers were carried, in 1869,	4	2
“ “ “ “ “ “ “ “ in 1871,		
For distances more than 5 and less than 15 miles, in 1869,	4	2½
“ “ “ “ “ “ “ “ in 1871,		
For distances more than 15 and less than 30 miles, in 1869,	3½	2
“ “ “ “ “ “ “ “ in 1871,		
For distances more than 30 and less than 50 miles, in 1869,	3½	1½
“ “ “ “ “ “ “ “ in 1871,		
For distances more than 50 and less than 100 miles, in 1869,	3¼	1¾
“ “ “ “ “ “ “ “ in 1871,		
Rate per mile the whole length of main line in Massachusetts, in 1869,	3¾	1½
Rate per mile the whole length of main line in Massachusetts, in 1871,	3¼	1½
Rate per mile for <i>through</i> passengers passing over the line to or from points on other roads within or beyond the State, in 1869,	3¾	1½
Rate per mile for <i>through</i> passengers passing over the line to or from points on other roads within or beyond the State, in 1871,	2¾	1½

Freight.

	First Class.	Second Class.	Third Class.	Fourth Class.	Coal.
Highest rate per ton per mile from Fitchburg,—	Cents.	Cents.	Cents.	Cents.	Cents.
For shortest distances freight was car- ried, in 1869,	30	25	20	20	—
For shortest distance freight was car- ried, in 1871,	30	25	20	20	—
For distances more than 5 and less than 15 miles, in 1869,	14½	14	10	8½	—
For distances more than 5 and less than 15 miles, in 1871,	—	—	—	—	—
For distances more than 15 and less than 30 miles, in 1869,	—	—	—	—	—
For distances more than 15 and less than 30 miles, in 1871,	—	—	—	—	—
For distances more than 30 and less than 50 miles, in 1869,	8½	6½	5½	4½	3½
For distances more than 30 and less than 50 miles, in 1871,	8½	6½	5½	4½	2¼
For distances more than 50 and less than 100 miles, in 1869,	—	—	—	—	—
For distances more than 50 and less than 100 miles, in 1871,	—	—	—	—	—
For the whole length of main line in Massachusetts, in 1869,	8	7¼	6½	4	3½
For the whole length of main line in Massachusetts, in 1871,	8	7¼	6½	4	2¼

Through freight, 1869, about . . . 3 cents per ton a mile.

Through freight, 1871, about . . . 2½ “ “

BOSTON & LOWELL RAILROAD.

Boston, December 5, 1871.

To the Hon. Board of Railroad Commissioners :

GENTLEMEN :—I am instructed by the President and Directors of the Boston & Lowell Railroad Corporation, to reply to the following interrogatories of your circulars addressed to them, dated August 10th, and September 30th last.

“*Interrogatory 1.* The date at which the local freight and local passenger tariffs, now in force upon the road under your direction were originally established, or last generally revised, and rates raised or reduced.”

Answer. The local freight tariff was last established January 1st, 1871, and has not since been revised. The local passenger tariff was established January 1, 1868. It has since been modified only in reducing the rate on mileage 33½ per cent.

Int. 2. What, if any partial revision, such tariffs have undergone, specifying generally the date of the same, and the degree in which rates were increased or decreased in such revision."

Ans. In 1859, a reduction of tariff rates was made at several points on our line, amounting, at Woburn, to $16\frac{2}{3}$ per cent., on passage tickets, and $12\frac{1}{2}$ per cent. on coal. At Lowell, season tickets were reduced $16\frac{2}{3}$ per cent., and coal 18 per cent. In 1860, season tickets at Woburn were further reduced 15 per cent. In 1862, season tickets were advanced at Woburn about 4 per cent., and single tickets at Lowell about 6 per cent. In 1864, season tickets at Woburn were advanced 20 per cent., merchandise 20 per cent., coal 25 per cent., and package tickets were reduced 14 per cent. At Lowell, tickets were advanced $12\frac{1}{2}$ per cent., merchandise about $12\frac{1}{2}$ per cent., and coal about 30 per cent. In 1865, tickets at Lowell were further advanced about 12 per cent., merchandise 20 per cent., and coal 6 per cent. Merchandise to Woburn was advanced about 20 per cent., and coal 25 per cent. In 1866, tickets at Lowell were reduced 10 per cent., and merchandise and coal about 9 per cent. In 1868, tickets at Lowell were reduced about 10 per cent., and coal 6 per cent. In 1870, coal was reduced at Lowell $16\frac{2}{3}$ per cent., and iron and other articles of heavy merchandise, 10 per cent. Mileage tickets were also sold at two cents per mile, being a reduction of $33\frac{1}{3}$ per cent. In 1871, coal to Woburn was reduced 10 per cent.

Int. 3. If any increase or reduction has been made, since October 1, 1869, please state in detail its amount and extent; and, in case of freights, enumerate the articles affected by it."

Ans. The amount and extent of this reduction are given in the preceding answer. The articles affected by it, were mainly coal, iron and its manufactures, lumber, grain, dyestuffs, brimstone, clay, rags and salt.

Int. 4. State what amount in money such increase or reduction was supposed to represent."

Ans. The estimated falling off in receipts, caused by tariff reductions in 1870, was forty thousand dollars.

Int. 5. State as nearly as you can the effect of such increase or reduction upon the business, gross receipts and net earnings of the road."

Ans.—The reduction of 1865 and 1866 caused a falling off in receipts. Since then, there has been a steady increase of about 6 per cent. average per annum; but it does not appear to have been caused by reduced rates.

The 6th interrogatory is covered by the above answers.

In the concluding paragraph of your circular of September 30th, you say: "While requesting of you carefully prepared information in detail upon all the above points, we by no means desire to limit you to these points alone. The importance of this subject to the Commonwealth at large cannot be overestimated, and the increasing tendency to legislate in regard to it is very manifest from the documents which accompanied our circular of August 10th. We therefore desire to furnish all possible information to the legislature as to what the corporations have done, and as to what they propose to do. This information we wish you to give in your own way, so that there may be no misapprehension upon the subject. With this general statement as to the ends in view, we leave the form in which the information shall be given, largely in your discretion."

Under this invitation, to take such latitude of reply as may be necessary to "correct misapprehension upon the subject," for it can now only be corrected and not prevented, as the statements of your circular of August 10th have already gone broadcast into the public prints, I beg leave to state that, in so far as the Boston & Lowell Railroad is concerned, you are quite incorrect in your statement that "it is now more than seven years since the last general revision of their tariffs was made by the railroad corporations of the State." The preceding statements of this paper show, that since the high tariff of 1865, we have made at least three revisions, and in the aggregate reduced to our principal points, 20 per cent. on passengers, and 25 per cent. on freight. Notwithstanding the great increase of wages, and many other important elements in operating expenses, costing us at least 50 per cent. more than they did ten years since, the average price of a passage ticket is actually less, and the price of transportation on coal and other important articles of consumption is scarcely more now, than it was in 1860.

The policy of our company in this respect is fully expressed in the following extract from the last report of the directors:—

"Believing that the interest of the road is promoted by conceding to the public the lowest possible tariff consistent with the maintenance of first-class accommodations and reasonable dividends, we have from time to time increased the train and station facilities, and diminished the scale of tariff prices, as fast as the increased traffic and the decreased cost of material would warrant."

You make a general suggestion towards cheap carriage of coal.

Our average gross return for transporting a ton of coal will not exceed one dollar. For this dollar we furnish wharfage and labor, and cars and haulage. The terminal charges paid out by us for wharfage and labor at Salem, are thirty cents per ton. At our own

wharves at Boston and Cambridge, the ground is costly and the rate there cannot well be reckoned less. The cars are idle one-half the year. The purchasers of coal are in the habit of buying upon the lowest possible market, and throwing it upon us in fleets, causing such annoyance to themselves and trouble to us, that we have in anticipation not only an increase of equipment for the half year's service, but further heavy terminal outlays in coal pockets and other expensive facilities, for a satisfactory handling of the business.

Our tariff is only about ten per cent. upon the full value of the coal. The amount received by us for transporting coal from the seaboard to the yards of the manufacturing companies in Lowell, is less than one-hundredth part of the amount paid for labor in the same yards. The mercantile fluctuations in the price of the article itself are frequently twice as much as we charge for transporting it; and, while we admit that "cheap coal is cheap power," when used for power, which it is not to any great extent on our line, we are unable to see how we can transport it for much less than our present tariff, or to appreciate that any practicable reduction on our part, below an average of a dollar a ton, could seriously affect the amount of its consumption.

Allow me to amend your somewhat sweeping statements of the reduced cost of equipment and materials. You say that "the locomotive which formerly cost \$30,000 now costs but \$12,000," &c. It is possible that, at about the close of the war, the government, or parties under some imperative urgency, might have paid as much as you state for a locomotive; but the highest cost to this company was in 1866, when we paid \$18,000 for one machine. With this exception, the highest cost to us, at any time, was \$15,500.

For a fair comparison of the cost of the principal items of operating expenses now, as compared with 1860, I beg to submit the following schedule.

Locomotives	have advanced from	\$8,500 to \$11,500.
Passenger cars	" "	\$2,300 to \$4,800.
Rails, best make	" "	\$63 to \$79 per ton.
Chestnut ties	" "	25 cents to 55 cents each.
Re-rolling rails	" "	\$25 to \$37 per ton.
Car wheels	" "	\$15 to \$19½ each.
Refined iron	" "	2½ cents to 3½ cents per pound.
Castings	" "	2½ cents to 3¾ cents per pound.
Clear pine lumber	has	\$45 to \$75 per M.
Black walnut	" "	\$55 to \$78 per M.
White wood	" "	\$35 to \$48 per M.

Spruce has advanced from \$13 to \$21 per M.

Wood for fuel has advanced from \$3.75 to \$5.25 per cord.

Coal " " " \$5.00 to \$7.00 per ton.

The element of wages alone is 46 per cent. of all our operating expenses, and in this item there has been a steady increase up to the present time. The increase in price of common labor is 65 per cent., and in mechanical and other skilled labor not less than 50 per cent.

Labor and materials represent nine-tenths of our expenses. They are shown above to cost 50 per cent. more than they did ten years ago. We are running for the public accommodation 70 per cent. more miles, the cost of which added to other advances enumerated above, swells up the aggregate of our expenses to more than one hundred per cent. above what they were in 1860.

The receipts per train mile for passengers, were then a dollar and six cents, and now a dollar and forty-eight. The receipts per train mile for freight, were then one dollar and seventy-four cents, and now two dollars and nine cents.

With an increased gross income of only 40 per cent. per train mile on passengers, and 20 per cent. per train mile on freight, we have barely been able to meet our heavily increased expenses, and preserve our ordinary moderate dividends.

It is only by the most vigilant watchfulness, to proportion the annual expenditure to the annual income—to foster and encourage all sources of revenue—to carefully feel the way in the imposition of rates, and the granting of new facilities, and to faithfully discipline and economize the movements of a thousand servants at numerous detached points, that we can expect to fulfil our two-fold duty of satisfying the public, who use our road, and reasonably remunerate the stockholders who own it. In the performance of these delicate and complicated duties, it may often happen that the apparently conflicting interests of the public and the proprietors, will lead to jealousy and an unreasonable amount of prejudice.

I have supposed that your honorable Commission was created to, in some measure, stand between the railroad corporations and their patrons, and to hold that just balance which should prevent misapprehension both of facts and intentions, in the working management of the roads. I have not supposed, and do not now suppose, that the Commission intends to go outside of this high position, or to seriously attempt advising the trained and experienced managers of roads in this Commonwealth upon the details of their duty. If, however, I am mistaken in this supposition, I shall for one be happy to receive any well grounded advice in matters pertaining to my profession, and to treat it with all due respect.

I trust, gentlemen, that you will publish in your report so much of this letter as will correct the statements contained in your circular of August 10, which were seriously erroneous, so far as they might be applied to the road under my management, and I remain,

Your obedient servant,

GEORGE STARK,

Manager of Boston and Lowell Railroad.

RATES FOR TRANSPORTATION ON THE BOSTON AND LOWELL RAILROAD.

Passengers

	Highest.	Lowest.
Rate per mile from station at Boston,—	Cents.	Cents.
For the shortest distance passengers were carried, in 1869,	10	5
“ “ “ “ “ “ in 1871,	10	5
For distances more than 5 and less than 15 miles, in 1869,	3	1
“ “ “ “ “ “ in 1871,	3	1
For distances more than 15 and less than 30 miles, in 1869,	3	0 $\frac{7}{10}$
“ “ “ “ “ “ in 1871,	3	0 $\frac{7}{10}$
For distances more than 30 and less than 50 miles, in 1869,	3	0 $\frac{1}{2}$
“ “ “ “ “ “ in 1871,	3	0 $\frac{1}{2}$
For distances more than 50 and less than 100 miles, in 1869,	3	0 $\frac{4}{5}$
“ “ “ “ “ “ in 1871,	3	0 $\frac{4}{5}$
Rate per mile the whole length of main line in Massachusetts, in 1869,	3	0 $\frac{1}{2}$
Rate per mile the whole length of main line in Massachusetts, in 1871,	3	0 $\frac{1}{2}$
Rate per mile for <i>through</i> passengers passing over the line to or from points on other roads within or beyond the State, in 1869,	2 $\frac{3}{4}$	1
Rate per mile for <i>through</i> passengers passing over the line to or from points on other roads within or beyond the State, in 1871,	2 $\frac{3}{4}$	1

Freight.

	First Class.	Second Class.	Third Class.	Fourth Class.	Coal.
Highest rate per ton per mile from Boston,—	Cents.	Cents.	Cents.	Cents.	Cents.
For the shortest distance freight was carried, in 1869,	20	20	20	20	16
For the shortest distance freight was carried, in 1871,	20	20	20	20	14
For distances more than 5 and less than 15 miles, in 1869,	10	10	10	10	8 $\frac{1}{3}$
For distances more than 5 and less than 15 miles, in 1871,	10	10	10	10	7 $\frac{1}{2}$

Freight—Continued.

	First Class.	Second Class.	Third Class.	Fourth Class.	Coal.
	Cents.	Cents.	Cents.	Cents.	Cents.
For distances more than 15 and less than 30 miles, in 1869,	8	7½	7	7	4¾
For distances more than 15 and less than 30 miles, in 1871,	8	7½	7	7	4¾
For distances more than 30 and less than 50 miles, in 1869,	7½	6½	5	5	3¾
For distances more than 30 and less than 50 miles, in 1871,	7½	6½	5	5	3¾
For distances more than 50 and less than 100 miles, in 1869,	6	5½	5	5	3
For distances more than 50 and less than 100 miles, in 1871,	6	5½	5	5	3
For the whole length of main line in Massachusetts, in 1869,	7½	6½	5	5	3¾
For the whole length of main line in Massachusetts, in 1871,	7½	6½	5	5	3¾

In submitting to the legislature the foregoing reply of the President and Directors of the Boston & Lowell Railroad Co. to the circular of the Commissioners, it seems not improper for them to add a few comments on the statements and criticisms contained in it. The circular of the Commissioners was necessarily a general one, addressed to the managers of all the railroad corporations of the State. It is manifestly impossible to draw up any communication of this nature which shall convey a correct impression as to the exact policy which has been pursued by every corporation. The Commissioners were perfectly aware, for instance, that the Boston & Providence Railroad had furnished a very striking exception to the general statement that an increase in tariff rates had been made by the corporations between 1860-5. They were equally aware, as appears from the tables contained in their last annual report (Second Report, Table No. 5), that since 1866, a continued reduction, both in freights and in fares, had been perceptible from the returns of the Boston & Lowell road. The very high appreciation in which they held the ability and energy evinced by this corporation in the management of its through freighting business was expressed, in no doubtful terms, in the same report (pp. 36-7). They must, however, be allowed to question the perfect accuracy of the statements in the above reply that

“the average price of a passenger ticket is actually less” now on the Boston & Lowell road than it was ten years ago, or that “the price of transportation on coal and other important articles is scarcely more” now than it was then. Upon such points as these the statement of the manager of the road is entitled to the utmost weight, and the Commissioners would not venture positively to controvert it. In view, however, of the method recently adopted of computing season-ticket passengers at 52 trips per month for short distances, instead of 40 trips, as formerly, and at 52 trips per month instead of 24 trips, as formerly, for longer distances; and in view, also, of the largely increased through freight tonnage of this company, at extremely low rates, the correctness of these statements is not immediately apparent from the returns. A comparison of tariffs would settle the question, but the company has been unable to furnish the Commissioners with copies of those of the earlier date.

That a heavy rise in prices of all railroad supplies took place between 1860–5, was admitted by the Commissioners in their circular and calls for no proof. That a perceptible decline in the price of many of those articles had since taken place, is matter of common notoriety. The Commissioners think it hardly worth while to join issue on the price of locomotives in 1865 as compared with 1870, as it appears to be admitted that they have decreased from 25 to 33 per cent., which is sufficient for their purpose.

In regard to the apparent greatly increased cost of operating this and other roads, as indicated in the returns, the Commissioners will have occasion to discuss this point in another connection. It is sufficient to say here, that even when made with the care and accuracy which marks those of the Boston & Lowell Railroad, the returns are yet, owing to the manner in which accounts are kept, very deceptive. So far as a long and patient investigation of them will enable the Commissioners to form an opinion, it is impossible to say what the real cost of *operating* any given railroad during a year is. The grounds upon which this opinion is ventured will be hereafter set forth more in detail.

The statement that “coal is not used for power to any great extent on our line,” seems to require some qualification, in

view of the fact that over 41,000 tons, driving 34 engines, of an aggregate of 5,320 horse-power, are consumed yearly in the mills of Lowell alone. Of this amount, no less than 14,000 tons, driving 22 engines of 2,010 horse-power, are reported to be consumed in the single mill of which the President of the Boston & Lowell Railroad Company is the treasurer. The Commissioners, however, do not feel at liberty to analyze the statements on this important point in the above communication. A wide difference of opinion in regard to it, and the duties of the Boston & Lowell road in this respect, obviously exists between the manager of that road and those most deeply interested in the manufacturing success of Lowell. In support of this statement, the Commissioners have the honor to refer to the very able statement of J. L. Stackpole, Esq., counsel for certain of the Lowell mill corporations, printed, with the accompanying documents, in Appendix D to this Report. As it must, in all probability, devolve upon the Commissioners officially to investigate this subject, they desire to add that they are in no way responsible for any of the statements contained in Appendix D; that they submit it as received by them, at the request of the parties; and, also, as offering a singularly timely illustration of the soundness of the policy contended for by them, both in their circular of August 10th, and in the third part of this Report.

In regard to the closing suggestion in the above communication, referring to the "supposed" duties of this Board, the Commissioners must remind the President and Directors of the Boston & Lowell Railroad Company that the object for which this Board was created is in no respect a matter of supposition. It is very clearly defined in the following statute language: "Whenever, in their judgment, any repairs are necessary upon the road of any railroad corporation, or *any addition to its rolling stock*, or any addition to or change of its stations or station-houses, or *any change in its rates of fare for transporting freight or passengers*, or *any change in its mode of operating its road*, or *conducting its business*, is reasonable and expedient, in order to promote the security, convenience and accommodation of the public, said railroad commissioners *shall* inform such railroad corporation of the improvements and changes which they adjudge to be proper, in writing * * ; and a report of the pro-

ceedings shall be included in the annual report of the commissioners to the legislature." (Acts 1869, ch. 408, § 3.) While, therefore, it is undoubtedly the most delicate and unpleasant duty which can devolve upon this Board "to seriously attempt advising the trained and experienced managers of roads in this Commonwealth on the details of their duty," an obligation in this respect would seem, under certain circumstances, to be imposed upon it. Meanwhile, the Commissioners cannot now, or at any time, regard a simple suggestion on their part that the managers of railroad corporations in general shall revise their tariffs, with a view to making such alterations as they shall themselves deem expedient, as any attempt at interference in the details of management. That it should be so regarded by the manager of any railroad corporation, would seem to carry the doctrine of absolute corporate irresponsibility to its extreme limit.

BOSTON & MAINE RAILROAD.

PRESIDENT'S OFFICE, BOSTON AND MAINE RAILROAD, }
HAYMARKET SQUARE, BOSTON, November 1, 1871. }

To the Hon. Railroad Commissioners of the Commonwealth of Massachusetts.

GENTLEMEN:—I return herewith yours of September 30, 1871, with the blanks filled as requested.

In explanation thereof, and in answer to your expressed desire, the following suggestions are made:—

Our last passenger tariff was established in 1867. By it our rates for single ticket passengers were arranged on the basis of three cents per mile.

Package tickets are sold at an average of $2\frac{1}{2}$ cents per mile.

Season ticket passengers, of which we have twenty-seven hundred, pay, on the average, $\frac{8.5}{100}$ cent per mile.

The question of rearranging the package system and reducing the rates has been under consideration, by the board of directors, for some time.

The general freight tariff has not been changed since 1867; but modifications have been made in it, from time to time, as circumstances seemed to require. The most important item affected is the article of coal. Large quantities of it are carried to Lawrence (26 miles) and the adjoining towns for ninety-one cents per ton (gross) by the cargo. This price covers all the expense to the consignee, from the vessel at our premises in Boston to its final destination. This is a deduction of at least forty-six per cent. from the tariff rates. The amount transported over our road has largely

increased of late, exceeding 65,000 tons for the current year. Many other articles are carried, in large quantities, at rates much below those specified in the printed tariff, such as pig-iron, lime, cement, paper stock, etc. The amount of freight on our road carried less than five miles is very small. The principal items in the charges for short freight are the terminal charges and the use of and detention of cars. These are about the same, whether for five or twenty-five miles. And while this fact makes the price per ton per mile seem high, it is in fact not so remunerative as longer freight at much less rates per mile.

In reference to yours of August 10, 1871, I would remark, respectfully, that notwithstanding the prices of coal, iron and steel have been reduced and a portion of the national taxes removed; yet, in many particulars, the expenses of maintaining and operating the road have not diminished, but *increased* rather. Take, for instance, labor in all its departments—skilled or unskilled—the pay to salaried officers, or for legal services—I am not aware of any reduction from the highest point ever attained. The general tendency is to increase, rather than diminish. The amount thus paid out, in fact, nearly overshadows all other elements of expense in operating the road.

The amount of taxes, though slightly diminished, is still several hundred per cent. more than before the war of the rebellion.

Engines and freight cars can be obtained cheaper than during the war, as the principal customer has withdrawn from the field.

But the cost of passenger cars was, probably, never greater than at present. The tendency is still higher cost, and nothing will prevent it but poverty on the part of the corporations.

At no time has the ratio of expense, as compared with the gross receipts, been so great as at the present. The demand of the public will not allow it to diminish.

Very respectfully yours,

F. COGSWELL, *President.*

PRESIDENT'S OFFICE, BOSTON AND MAINE RAILROAD, }
HAYMARKET SQUARE, BOSTON, December 5, 1871. }

To the Hon. Railroad Commissioners.

GENTLEMEN:—Yours of December 1st was duly received, and would have been replied to earlier but for my absence from town. Referring to your inquiry in regard to the price of transporting coal over the Boston & Maine Railroad in 1869, I would say, that I find that coal was at that time carried between Boston and Lawrence, Boston and Andover, and Boston and Reading, for one dollar per ton; between Boston and Wakefield, for ninety cents

per ton; and between Boston and Melrose and Malden, for eighty cents per ton. Coal has since been carried between Boston and the three first-named stations for ninety-one cents per ton; between Boston and Wakefield for eighty-five cents per ton; and between Boston and Melrose and Malden for seventy-five cents per ton.

The amount carried the previous year was about 48,000 tons. The difference in money to this road between the rates of 1869 and since on the amount carried would be about nine cents per ton on 40,000 tons, and five cents per ton on 8,000 tons.

Referring to your inquiry in regard to the rates per mile for the transportation of passengers over this road, I would say that our highest rates per mile are, as stated, three cents per mile.

It is true we do vary from the exact rate of three cents per mile, in order to adapt the price to currency. For example, from Boston to Charlestown, one mile, we charge five cents, but from Boston to Somerville, two miles, we charge six cents; from Boston to Melrose, seven miles, we charge twenty cents; also to Stoneham, eight miles, twenty cents. Boston to Reading, twelve miles, we charge thirty-five cents.

The receipts for the year past, on local business, varied only $1\frac{5}{6}$ from three cents per mile.

In order that you may have before you the means of informing yourselves fully in reference to our rates for the transportation of passengers, I take the liberty to herewith send you our last passenger tariff.

In addition to what I have before written in reference to the price for transporting coal, I would say that in the year 1869 about 8,000 tons were sent from Boston to Haverhill at \$1.25 per ton. A like amount was sent to the same place in 1870 at one dollar per ton, making a difference to this road and in favor of customers of \$2,000. Very truly and respectfully yours,

N. G. WHITE, *President.*

RATES OF TRANSPORTATION ON THE BOSTON AND MAINE RAILROAD.

Passengers.

	Highest.	Lowest.
Rate per mile from station at Boston,—	Cents.	Cents.
For the shortest distance passengers were carried, in 1869,	3	—
“ “ “ “ “ “ in 1871,	3	—
For distances more than 5 and less than 15 miles, in 1869,	3	—
“ “ “ “ “ “ in 1871,	3	—
For distances more than 15 and less than 30 miles, in 1869,	3	—
“ “ “ “ “ “ in 1871,	3	—

Passengers—Continued.

	Highest.	Lowest.
	Cents.	Cents.
For distances more than 30 and less than 50 miles, in 1869,	3	—
“ “ “ “ “ in 1871,	3	—
For distances more than 50 and less than 100 miles, in 1869,	3	—
“ “ “ “ “ in 1871,	3	—
Rate per mile the whole length of main line in Massachusetts, in 1869,	3	—
Rate per mile the whole length of main line in Massachusetts, in 1871,	3	—
Rate per mile for <i>through</i> passengers passing over the line to or from points on other roads within or beyond the State, in 1869,	1 $\frac{75}{100}$	1 $\frac{75}{100}$
Rate per mile for <i>through</i> passengers passing over the line to or from points on other roads within or beyond the State, in 1871,	1 $\frac{75}{100}$	1 $\frac{75}{100}$

Package tickets are sold on an average of $2\frac{1}{2}$ cents per mile. Season tickets are sold on an average of 85-100 cent per mile.

Freight.

	First Class.	Second Class.	Third Class.	Fourth Class.	Coal.
Highest rate per ton per mile from Boston,—	Cents.	Cents.	Cents.	Cents.	Cents.
For shortest distance freight was carried, in 1869,	21	18	—	—	15
For shortest distance freight was carried, in 1871,	21	18	—	—	15
For distances more than 5 and less than 15 miles, in 1869,	10.4	9.6	—	—	7.6
For distances more than 5 and less than 15 miles, in 1871,	10.4	9.6	—	—	7.6
For distances more than 15 and less than 30 miles, in 1869,	7.5	6.4	—	—	3.5
For distances more than 15 and less than 30 miles, in 1871,	7.5	6.4	—	—	3.5
For distances more than 30 and less than 50 miles, in 1869,	7.1	5.6	—	—	—
For distances more than 30 and less than 50 miles, in 1871,	7.1	5.6	—	—	—
For distances more than 50 and less than 100 miles, in 1869,	5.5	4.1	—	—	—
For distances more than 50 and less than 100 miles, in 1871,	5.5	4.1	—	—	—
For the whole length of main line in Massachusetts, in 1868,	5.5	4.1	—	—	—
For the whole length of main line in Massachusetts, in 1871,	5.5	4.1	—	—	—

BOSTON AND PROVIDENCE RAILROAD.

BOSTON AND PROVIDENCE RAILROAD CORPORATION, }
PRESIDENT'S OFFICE, BOSTON, Oct 26, 1871. }

To the Hon. the Railroad Commissioners of the Commonwealth of Massachusetts.

GENTLEMEN:—Your circulars under date of August 10, 1871, and of September 30, 1871, respectively, have been duly received at this office. In both of these communications you substantially invite an expression of my views upon a problem not easy of solution, namely: In what manner and through what processes, it is practicable for this corporation to continue to increase its expenditures, by furnishing better depot accommodations, running additional trains, by introducing new and expensive appliances for the safety, convenience and comfort of the public, and otherwise, while seriously diminishing the sources of its revenue by the reduction of its rates for passengers and freight, and at the same time to leave to its stockholders, embracing a large number of citizens of the Commonwealth, of moderate, and many of humble means, such a remuneration for their surplus, or their savings, as the case may be, which have been invested in its stock, as the legislature has repeatedly recognized to be reasonable and just?

I can only state, in reply to your inquiries, which seem to me to embrace this difficult problem, that for any railroad corporation, whose affairs are administered with an honest purpose to give to the public, unreservedly, its fair share of all its prosperity, and to retain for its stockholders only a moderate and just proportion of its earnings, I do not see how this feat of financial legerdemain can be accomplished.

Whenever a railroad corporation evinces a disposition to evade or shirk its proper responsibilities to the public, and by any indirection to reserve for its stockholders any portion of its earnings which ought rightfully to be expended upon its road-bed, its station houses or its equipment, I can see the justice and propriety of the legislature, as the guardian of the public interests, interposing with the strong hand of the law to coerce such a corporation into the proper performance of its duty. Fully recognizing the nature and functions of these corporations as being to a great extent of a public character, and that they are bound in that character to the utmost vigilance and alacrity in promoting the public interests and convenience, I know of no way in which these objects can be secured other than by making their revenues bear a proper proportion to their expenditures.

Large as has been the agency of railroads in advancing the civilization, increasing the comforts, and promoting the general prosperity of the people, and immense as have been the additions they have made to the wealth of Massachusetts, it is only quite

recently that they have been a remunerative property to their owners; and it is within the experience and observation of every one who has given any attention to the subject, that in order to furnish safe, speedy and commodious means of transportation of passengers and freight, they must enjoy a reasonable degree of prosperity for themselves. If by ill-considered legislation, or by undue competition, their income is reduced and their resources crippled, the stockholders in them are not the only sufferers. The public must share with them all the discomforts and perils of poverty, and submit to the lack of all the new conveniences and safeguards which they are too poor to furnish, and in the general indifference to the public safety and comfort which uncompensated service is certain to induce.

In other words, gentlemen, you will pardon me for saying, the true policy which it seems to me the responsibilities of your Board to these corporations and to the public may properly lead you to urge and to enforce is, not at what lowest possible rates the railroad business of Massachusetts can be carried on, but how cheaply can the highest and most satisfactory railroad service be performed, at such rates as will inspire the encouraging conviction in the minds of the managers of the railroads, that while they are thus rendering their best service, they are also advancing the prosperity of the respective corporations whose interests it is their duty to promote and protect?

The pertinency of these considerations to the main subjects of your inquiries cannot find a more striking illustration than in the history of the operations of this corporation during the last few years. Having, like most of our New England railroads, struggled through trying experiences of adverse fortune, paying no dividends, and with its stock below par in the market, it was the subject of constant complaint that its managers were not doing impossibilities to satisfy the demands of the travelling public. To maintain the efficiency of the road in all its departments in which the public had an interest, so far as its resources would permit, they devoted for a series of years so large a proportion of its gross earnings to expenses as to leave its stock a very poor investment for its stockholders. This policy, originally adopted by them in deference to their voluntary recognition of the rights of the public, and not forced upon them by legislative authority or popular panic and clamor arising from railroad disasters, was steadfastly adhered to up to the time when the war of the rebellion had so materially changed all the standards of value, both of materials and labor, in operating the railroads of the country.

At this period, when there was every temptation and ample justification for increasing the rates charged to the public for the

benefit of its stockholders, and when, in fact, every other railroad leading from Boston did advance its rates to a point which the greatly increased cost of everything required to carry on its business fully warranted, no increase of their rates for either passengers or freight was made by the managers of this corporation. Upon this road the public continued, and still continues, to be served at the same rates as existed before the war, notwithstanding the severe service to which all its equipment and all its employes were subjected by the establishment of the military camp at Readville,—a service which was rendered without demanding a dollar of additional compensation above the previously existing tariffs; from either the State or national governments, while it was performed in such a manner as to receive the warmest commendation from the late Governor Andrew and from Mr. Stanton, the then secretary of war.

By referring to the answers which I have prepared to the specific inquiries of the Commissioners, and which accompany this communication, marked A, B, and C, it will appear—

1st. That there has been no change in the local passenger tariff of this road since the 1st of August, 1859, and none in the local freight tariff since the 1st of March, 1861, and that both these tariffs are moderate and reasonable for the character of the service to which they apply.

2d. That for the last four years, from 1868 to 1871 inclusive, the highest rate charged per passenger per mile was $2\frac{5}{10}$ cents; and the lowest $1\frac{5}{10}$ cts., the average being $2\frac{3}{10}$ cents per mile for each passenger carried upon the road.

3d. That for the same period the highest rate charged for a ton of freight per mile was $3\frac{7}{10}$, and the lowest $3\frac{4}{10}$, the average being $3\frac{6}{10}$ per ton, for each mile carried, including all depot charges, and that the well understood cost of transportation leaves upon both these averages a very moderate sum as the net earnings therefrom.

4th. That the gross income received during the same period from all sources, was \$4,914,811 $\frac{6}{10}$, of which \$3,616,761 $\frac{6}{10}$, or 73 $\frac{6}{10}$ per cent. was expended in operating the road, in preserving and renewing it from wear and tear, in supplying it with suitable stations and equipment, in introducing upon it new and approved inventions and improvements, and in taxes, gratuities and damages, leaving \$1,298,050, or 26 $\frac{4}{10}$ per cent. as the net earnings of the road during that period, to be distributed to its stockholders.

With these statements, verified by the returns of the treasurer, and signally so by his returns of the present year through your Board to the legislature, to which I invite your particular attention

as evincing the liberality of the corporation in its expenditures for the public interests, I respectfully submit to the Board the question, whether those interests are likely to be subverted by any reduction of a tariff, which, so far as I am aware, is not regarded as otherwise than reasonable, as it stands, by the great body of freighters and travellers having occasion to use the facilities now furnished them by this corporation.

Very respectfully, your obedient servant,

JOHN H. CLIFFORD, *President.*

[A.]

[Extract from Circular of Commissioners and replies thereto.]

We desire now very respectfully to request that you will, at the time you send in your returns for the year ending this day, also send in, at as much length as you may see fit, all the information in your possession on the following points, viz. :—

1. The date at which the local freight and local passenger tariffs now in force upon the road under your direction were originally established, or last generally revised and rates raised or reduced.

A. Last revision of local freight tariff, 1 March, 1861.

“ “ “ passenger do., 1 August, 1859.

2. What, if any, partial revisions such tariffs have undergone, specifying generally the date of the same, and the degree in which rates were increased or decreased in such revision.

A. None.

3. If any increase or reduction has been made since 1st October, 1869, please state in detail its amount and extent; and, in case of freights, enumerate the articles affected by it.

A. None.

4. State what amount in money such increase or reduction was supposed to represent.

A. Nothing.

5. State as nearly as you can the effect of such increase or reduction upon the business, gross receipts and net earnings of the road.

A. Nothing.

6. Have any reductions been made since October, 1869, in the charges on coal and the raw materials of manufacture? If so, state specifically what, and give such information as you possess as to the effect, direct and indirect, of such reduction in stimulating the business of your road.

A. No.

7. Please cause the tables on the following page to be filled out and forwarded with your reply.

A. See Exhibit B.

[B.]

RATES FOR TRANSPORTATION ON THE BOSTON AND PROVIDENCE
RAILROAD.

Passengers.

	Highest.	Lowest.
Rate per mile from station at Boston,—	Cents.	Cents.
For the shortest distance passengers were carried, in 1869,	5	2 $\frac{1}{4}$
“ “ “ “ “ “ in 1871,	5	2 $\frac{1}{4}$
For distances more than 5 and less than 15 miles, in 1869,	3 $\frac{1}{5}$	1 $\frac{6}{100}$
“ “ “ “ “ “ in 1871,	3 $\frac{1}{5}$	1 $\frac{6}{100}$
For distances more than 15 and less than 30 miles, in 1869,	3 $\frac{1}{10}$	0 $\frac{3}{4}$
“ “ “ “ “ “ in 1871,	3 $\frac{1}{10}$	0 $\frac{3}{4}$
For distances more than 30 and less than 50 miles, in 1869,	3 $\frac{1}{10}$	0 $\frac{68}{100}$
“ “ “ “ “ “ in 1871,	3 $\frac{1}{10}$	0 $\frac{68}{100}$
For distances more than 50 and less than 100 miles, in 1869,	None.	None.
“ “ “ “ “ “ in 1871,	“	“
Rate per mile the whole length of main line in Massachusetts, in 1869,	3 $\frac{1}{10}$	0 $\frac{68}{100}$
Rate per mile the whole length of main line in Massachusetts, in 1871,	3 $\frac{1}{10}$	0 $\frac{68}{100}$
Rate per mile for <i>through</i> passengers passing over the line to or from points on other roads within or beyond the State, in 1869,	2 $\frac{78}{100}$	2 $\frac{78}{100}$
Rate per mile for <i>through</i> passengers passing over the line to or from points on other roads within or beyond the State, in 1871,	2 $\frac{68}{100}$	2 $\frac{68}{100}$

Freight.

	First Class.	Second Class.	Third Class.	Fourth Class.	Coal.
Highest rate per ton per mile from Boston,—					
For shortest distance freight was carried, in 1869,	\$1 00	\$0 80	None.	None.	\$0 60
For shortest distance freight was carried, in 1871,	1 00	1 00	\$1 00	“	60
For distances more than 5 and less than 15 miles, in 1869,	1 30	1 00	1 00	“	60
For distances more than 5 and less than 15 miles, in 1871,	1 30	1 00	1 00	“	60
For distances more than 15 and less than 30 miles, in 1869,	1 90	1 30	1 00	“	1 00
For distances more than 15 and less than 30 miles, in 1871,	1 90	1 30	1 00	“	1 00

Freight—Continued.

	First Class.	Second Class.	Third Class.	Fourth Class.	Coal.
For distances more than 30 and less than 50 miles, in 1869,	\$3 00	\$2 20	\$1 60	None.	\$1 60
For distances more than 30 and less than 50 miles, in 1871,	3 00	2 20	1 60	"	1 60
For distances more than 50 and less than 100 miles, in 1869,	None.	None.	None.	"	None.
For distances more than 50 and less than 100 miles, in 1871,	"	"	"	"	"
For the whole length of main line in Massachusetts, in 1869,	3 00	2 20	1 60	"	1 60
For the whole length of main line in Massachusetts, in 1871,	3 00	2 20	1 60	"	1 60

In above statement we have considered the whole line as in Massachusetts, only a small portion of the line (about five miles) being outside of the State of Massachusetts.

JOHN H. CLIFFORD, *President.*

[C.]

Passenger Tariff last revised August, 1859.

	No. of Passengers carried one mile.	Income.	Average per mile, in cents.
1868,	33,633,464	\$657,878 18	1 ⁹⁵ / ₁₀₀
1869,	29,996,489	724,849 96	2 ⁴² / ₁₀₀
1870,	22,606,449	576,424 28	2 ⁵⁵ / ₁₀₀
1871,	31,134,145	761,517 98	2 ⁴⁴ / ₁₀₀
	117,370,547	\$2,720,670 40	2 ³² / ₁₀₀

Freight Tariff last revised March 1, 1861.

	No. of Tons carried one mile.	Income.	Average per mile, in cents.
1868,	12,648,447	\$167,096 96	3 ⁶⁹ / ₁₀₀
1869,	13,021,748	503,512 24	3 ⁸⁷ / ₁₀₀
1870,	17,499,876	431,190 76	3 ⁴⁵ / ₁₀₀
1871,	16,214,014	604,196 39	3 ⁷² / ₁₀₀
	54,384,085	\$2,005,996 35	3 ⁶⁹ / ₁₀₀

Gross earnings from all sources for the four years 1868 to 1871,	\$4,914,811 62
Expenses of all kinds during same time (or about $73\frac{6}{10}$ of the gross receipts),	\$3,616,761 62
Balance divided among the stockholders, being about $26\frac{4}{16}$ of the gross receipts,	\$1,298,050 00

JOHN H. CLIFFORD, *President.*

One essential object of the Commissioners in issuing the circulars of August 10th and September 30th, was to elicit from those entrusted with the management of the several railroad corporations statements in their own terms of the policy which had recently been pursued. The value and importance of these full expressions of opinion, as shedding light on one of the most interesting questions of the day, cannot well be over-estimated; in many cases they cannot but go far towards dispelling any sentiment of popular discontent which may exist without sufficient cause.

It affords the Commissioners the utmost satisfaction to add their testimony to that of its President in regard to the exceptionally liberal policy pursued by the Boston & Providence Railroad Co. during the last ten years. This corporation certainly met the crisis of paper-money inflation in a manner which reflected the utmost credit upon it. Relying upon the increase of its business, through the growth of the population it served, it met and overcame the greatly increased cost of operation without seeking to impose, as it well might have done, any increased tax upon the community dependent upon it. It is most satisfactory to know that this bold policy on its part has in the result more than justified its adoption. Certainly no railroad corporation in the Commonwealth presents a more successful financial record since 1860, or is more prosperous now than the Boston & Providence. Yet this very record and the present condition of the company, is nothing less than an unanswerable argument in favor, so far as the interests of the railroads themselves are concerned, of the lowest reasonable tariff rates. It was the continued existence of these, and the popular faith in their permanence, which built up during the last ten years that local passenger traffic along the line of the road, which is one chief source of its prosperity. The same policy has more recently been adopted on other roads, and it will unquestionably lead to a similar result.

Meanwhile, the very fact stated in the foregoing communication, that the existing passenger and freight tariffs of the road have remained unchanged, the first since 1859,—and the last since 1861,—would seem to furnish a strong presumptive argument in favor of the revision suggested by the Commissioners. In this country, and particularly at a time so remarkable for changes as the present, it seems improbable that a railroad tariff, well adapted to the condition of affairs in 1859, or in 1861, should be also perfectly adapted to that existing in 1872. While, therefore, the Commissioners give full credit to this corporation for the exceptional course pursued by it in the past, it seems, in view of its present condition, not unreasonable to suggest the propriety of new experiments in the future.

In the case of this corporation, as of several others, the Commissioners seem to have unfortunately failed in making themselves clearly understood upon one important point. It seems to have been inferred that they wished to suggest such a reduction of charges as must either deprive stockholders of their reasonable remuneration on capital invested, or else must cripple the corporation as regards its power of properly operating its road. No such alternative was in the minds of the Commissioners when they issued their circulars. They then used this language: "It is a perfectly well-established fact in railroad economy, that where a community is industrially in an elastic condition, ready at once to respond to any remission of burdens or improved appliances, a reduction of railroad charges within certain limits does not necessarily involve any loss of net profits to the corporations making it. The increase of business and consequent multiplication of reduced profits more than compensates for the smaller return from each transaction." It was upon this ground, so fully illustrated in the past history of the Boston & Providence Railroad itself, that they based their suggestion of a revision.

Both the misapprehension of their meaning, and its perfectly practical nature may best, perhaps, be illustrated by four short extracts from the reports of three different corporations of this State for the last year, and from one foreign document for a former year; and the illustration thus afforded will obviate any necessity of again recurring to the subject.

“I can only state, in reply to your inquiries, * * * that for any railroad corporation, whose affairs are administered with an honest purpose to give to the public, unreservedly, its fair share of all its prosperity, and to retain for its stockholders only a moderate and just proportion of its earnings, I do not see how this feat of financial legerdemain (reducing the rates while sustaining the mode of operation) can be accomplished.”—*Report of Boston & Providence R. R. Co.*, 1871; p. 11-12.

“In their recent circular, the Railroad Commissioners of Massachusetts recommend a reduction in the passenger and freight tariffs of the roads of that State. But where a road, managed with judgment and economy, uses up all its earnings in its expenses and moderate dividends, which is the case with most New England roads, it must be apparent that no large reduction can be made unless the public will be satisfied to use dilapidated roads and less comfortable and commodious equipment, which would be poor economy. Whatever reduction is made must come from the net earnings, the expenses being the same.”—*Report of Providence & Worcester R. R. Co.*, 1871, p. 12.

“Considerable reduction has been made during the last year in the local fares and freights, especially in the district within fifteen miles from Boston. This has resulted in an immediate increase in our business; and the development of the towns and villages along the line of the road promises a greater increase in the future.”—*Report of Old Colony & Newport R. Co.*, 1871, p. 9.

“In eight years, between 1856-64, the charges on goods have been lowered, on an average by 28 per cent.; the public have sent 2,706,000 tons more goods, while they have actually saved more than \$4,000,000 on the cost of carriage, and the public treasury has earned an increased net profit of \$1,150,000.”—*Report of Royal Commission on Railways*, 1867. App. A. S.; referring to *State Railroad of Belgium*.

CAPE COD RAILROAD.

OFFICE OF CAPE COD RAILROAD COMPANY, }
HYANNIS, MASS., November 15, 1871. }

GENTLEMEN:—In reply to your circular of September 30th, 1871, will say: The changes in tariffs for passengers and freight have been very slight in rate since the first, in 1848. In 1868, after the purchase of the Cape Cod Central Railroad—Yarmouth to Orleans, 19 miles—by this company, new tariffs were made on substantially the old basis.

In 1870, after extension from Orleans to Wellfleet, the tariff for

passengers, in present use, was made, and the rates varied slightly to conform to the following basis,—three (3) cents per mile for Boston and way stations on the Old Colony and Newport Railway, and $3\frac{1}{2}$ cents for 60 miles and $4\frac{1}{2}$ cents for 5 miles, and in a proportionate ratio for distances between 5 and 60 miles.

On passengers by stages and steamboat to and from us, this company realizes less than three cents per mile, as amount realized by this company is less than regular tariff rates.

Most of our freighting for corporations and traders is by contract, at rates much below our tariff. For example: for traders at Yarmouth and Hyannis, at about 13 cents per hundred pounds from and to Boston, about 75 miles. Boston & Sandwich Glass Co. have its freight from Boston to Sandwich, 62 miles, at \$16 per 8-wheel car for light freight, and \$1.75 per ton for heavy freight.

The nail companies in Wareham have for years paid \$1.60 cents per ton to Boston on nails, and \$2 per ton for iron from Boston, &c., &c.

Herewith I return your circular, with answers to questions thereon.

Very respectfully, yours,

E. N. WINSLOW; *Supt.*

TO HON. RAILROAD COMMISSIONERS.

RATES FOR TRANSPORTATION ON THE CAPE COD RAILROAD.

Passengers.

	Highest.	Lowest.
Rate per mile from station at Middleborough,—	Cents.	Cents.
For the shortest distance passengers were carried, in 1869,	3.51	1.62
“ “ “ “ “ in 1871,	3.51	1.39
For distances more than 5 and less than 15 miles, in 1869,	3.89	0.90
“ “ “ “ “ in 1871,	3.89	0.76
For distances more than 15 and less than 30 miles, in 1869,	3.86	0.67
“ “ “ “ “ in 1871,	3.86	0.62
For distances more than 30 and less than 50 miles, in 1869,	3.78	0.56
“ “ “ “ “ in 1871,	3.78	0.53
For distances more than 50 and less than 100 miles, in 1869,	3.58	0.53
“ “ “ “ “ in 1871,	3.58	0.51
Rate per mile the whole length of main line in Massachusetts, in 1869,	—	0.53
Rate per mile the whole length of main line in Massachusetts, in 1871,	—	0.51
Rate per mile for <i>through</i> passengers passing over the line to or from points on other roads within or beyond the State, in 1869,	3.07	0.30
Rate per mile for <i>through</i> passengers passing over the line to or from points on other roads within or beyond the State, in 1871,	2.83	0.26

Freight.

	First Class.	Second Class.	Third Class.	Fourth Class.	Coal.
Highest rate per ton per mile from Middleborough,—	Cents.	Cents.	Cents.	Cents.	Cents.
For shortest distance freight was car- ried, in 1869,	20	18	—	—	—
For shortest distance freight was car- ried, in 1871,	20	18	—	—	—
For distances more than 5 and less than 15 miles, in 1869,	10.3	9.6	—	—	—
For distances more than 5 and less than 15 miles, in 1871,	10 3	9.6	—	—	—
For distances more than 15 and less than 30 miles, in 1869,	7 2	6.3	—	—	—
For distances more than 15 and less than 30 miles, in 1871,	7.2	6.3	—	—	—
For distances more than 30 miles and less than 50 miles, in 1869,	7.3	5 8	—	—	—
For distances more than 30 miles, and less than 50 miles, in 1871,	7 3	5.8	—	—	—
For distances more than 50 miles, and less than 100 miles, in 1869,	7	5.6	—	—	—
For distances more than 50 miles and less than 100 miles, in 1871,	7	5.6	—	—	—
For the whole length of main line in Massachusetts, in 1869,*	—	—	—	—	—
For the whole length of main line in Massachusetts, in 1871,*	—	—	—	—	—

* Average Boston freight, which is most of our freight, 3.90 cents per mile.

Respectfully submitted,

E. N. WINSLOW, *Supt. and Treasurer.*

CHESHIRE RAILROAD.

CHESHIRE AND ASHUELOT RAILROADS, SUPERINTENDENT'S OFFICE, {
KEENE, N. H., November 6, 1871. }

Messrs. J. C. CONVERSE AND C. F. ADAMS, Jr., *Railroad Commissioners, Boston, Mass.*

GENTS:—We respectfully reply to your communication of Sept. 30, 1871, as follows:—

The date of our freight tariff now in force is June 1, 1870, which gave a general reduction from former tariffs, both in rates and by classification, but being so varied that it is impossible to give an exact synopsis of items. We think, however, it amounted to about twenty per cent.

Since June 1, 1871, we have made further reductions by special contracts, and by continuing the summer rates as per tables shown in accompanying tariffs.

In regard to the effect on our business consequent upon the reductions alluded to, we would state in general terms, that we think it has stimulated business and encouraged manufacturing and other interests at our local stations, so that if our present earnings have not thereby increased, we think that will be the final result.

The date of our passenger tariff in force on the first of October ult., was March 1, 1867, and was not materially different from the previous one dated in 1864.

April 11, 1870, we commenced a general sale of mileage and package tickets, which virtually reduced our fares from fifteen to twenty-five per cent. And Nov. 1, inst., we have issued a new tariff, making a general and further reduction of about one-half a cent per mile, both on the regular and special tariffs. We thus answer your questions in a general manner, as it is impossible to give particular and definite replies to the separate inquiries.

We also beg leave to present the enclosed figures in reply to the questions in tabular form on your circular, and we also enclose tariffs.

This table, of course, shows much higher rates, per mile, than we receive on the bulk of our freight business; and as will be seen by tariffs, the first and second class include only light and bulky articles, which are always in small quantities.

Our through tonnage runs from say four to one-half cents per ton per mile. All of which is respectfully submitted.

Per order of the directors,

R. STEWART, *Superintendent.*

CHESHIRE AND ASHUELOT RAILROADS, SUPERINTENDENT'S OFFICE, }
KEENE, N. H., November 25, 1871. }

WM. A. CRAFTS, *Secretary Railroad Commissioners.*

DEAR SIR:—In reply to yours of 23d inst., I find the discount from regular fares on this road for the year consequent upon the sale of mileage, package and excursion tickets at reduced fares amounts to \$7,221.28, or about one-half cent per mile, on our local sales, having had quite a large sale of excursion tickets at half fare, besides mileage tickets at two cents, two and one-half cents, and three cents, and package at three cents; the variations on our receipts for freight being so numerous and diversified by being partly on rates and partly by classification, and the classes being numerous, that it is utterly impossible to show the amount. The passenger business or rates being more even and uniform, made it comparatively easy to answer your question. Very truly, yours,

R. STEWART, *Superintendent.*

RATES FOR TRANSPORTATION ON THE CHESHIRE RAILROAD.

*Passengers.**

	Highest.	Lowest.
Rate per mile from station at Fitchburg,—	Cents.	Cents.
For the shortest distance passengers were carried, in 1869,	4	2½
“ “ “ “ “ in 1871,	3½	2
For distances more than 5 and less than 15 miles, in 1869,	3½	2
“ “ “ “ “ in 1871,	3½	2
For distances more than 15 and less than 30 miles, in 1869,	3½	2
“ “ “ “ “ in 1871,	3½	2
For distances more than 30 and less than 50 miles, in 1869,	3½	2
“ “ “ “ “ in 1871,	3½	2
For distances more than 50 and less than 100 miles, in 1869,	3½	2
“ “ “ “ “ in 1871,	3½	2
Rate per mile the whole length of main line in Massachusetts, in 1869,	3½	2
Rate per mile the whole length of main line in Massachusetts, in 1871,	3½	2
Rate per mile for <i>through</i> passengers passing over the line to or from points on other roads within or beyond the State, in 1869,	3½	—
Rate per mile for <i>through</i> passengers passing over the line to or from points on other roads within or beyond the State, in 1871,	3	—

* From Tariff of Nov. 1, 1871.

RATES FOR TRANSPORTATION ON THE CHESHIRE RAILROAD—Concluded.

Freight.

	First Class.	Second Class.	Third Class.	Fourth Class.	Fifth Class.	Coal.	Flour and Grain.	Granite.
Highest rate per ton per mile from Fitchburg,—								
For shortest distance freight was carried, in 1869, . . .	\$0 23	\$0 16	\$0 14	\$0 13	\$0 10	\$0 07	\$0 05	\$0 05
“ “ “ in 1871, . . .	20	15	13	11	9	7	5	5
For distances more than 5 and less than 15 miles, in 1869, . .	23	16	14	13	10	7	5	5
“ “ “ 5 “ “ 15 “ in 1871, . . .	20	15	13	11	9	7	5	5
“ “ “ 15 “ “ 30 “ in 1869, . . .	18	14	12	9	7	4	4	3 $\frac{3}{4}$
“ “ “ 15 “ “ 30 “ in 1871, . . .	15	13	12	8	7	4	4	3 $\frac{3}{4}$
“ “ “ 30 “ “ 50 “ in 1869, . . .	12	10	9	6 $\frac{1}{2}$	4	2 $\frac{3}{4}$	2 $\frac{1}{2}$	3
“ “ “ 30 “ “ 50 “ in 1871, . . .	11 $\frac{1}{2}$	9 $\frac{1}{2}$	8	6	4	2 $\frac{3}{4}$	2 $\frac{1}{2}$	3
“ “ “ 50 “ “ 100 “ in 1869, . . .	11	8 $\frac{1}{2}$	7	5 $\frac{1}{2}$	3 $\frac{1}{2}$	2 $\frac{1}{2}$	2 $\frac{1}{2}$	2 $\frac{1}{2}$
“ “ “ 50 “ “ 100 “ in 1871, . . .	11	8 $\frac{1}{2}$	7	5 $\frac{1}{2}$	3 $\frac{1}{2}$	2 $\frac{1}{2}$	2 $\frac{1}{2}$	2 $\frac{1}{2}$
For the whole length of main line in Massachusetts, in 1869, .	19	16	13	10 $\frac{1}{2}$	7 $\frac{1}{2}$	5	5	3 $\frac{3}{4}$
“ “ “ “ “ in 1871, . . .	16	15	11 $\frac{1}{2}$	9 $\frac{1}{2}$	7 $\frac{1}{2}$	5	5	3 $\frac{3}{4}$

CONNECTICUT RIVER RAILROAD.

CONNECTICUT RIVER RAILROAD COMPANY, PRESIDENT'S OFFICE, }
SPRINGFIELD, MASS., November 10, 1871. }

To the Board of Railroad Commissioners.

GENTLEMEN:—My answers to the several points made in your circular of Sept. 30, 1871, are as follows, viz:—

To No. 1. Our local freight tariff was revised July 1st 1868, the tariff of October 1st, 1864, being reduced about twelve per cent. The local passenger tariff in force on the 30th day of September, 1871, was established in 1864. On the 1st of October, 1871, the local passenger rates were reduced from three and three-quarters cents to three and one-half cents per mile.

To No. 2. August 1st, 1869, the freight tariff to Northampton and points above was reduced about thirteen per cent.

To Nos. 3, 4, 5 and 6. By change of classification in July, 1871, the rates on cotton and other raw materials of manufactures, from Springfield to Chicopee and Holyoke, were reduced about thirteen per cent. Since September 30th, other and large reductions have been made, and others still are contemplated, in the tariffs on coal and raw materials, but all the changes are so recent that we are unable at this time to state their effects upon the net receipts of the road.

To No. 7. See tables inclosed herewith.

Referring to the opening paragraph in your circular letter of September 30th, permit me to remark, that in the year 1861 the average cost per mile for running the trains on our road was seventy-nine cents, and the operating expenses absorbed fifty-one per cent. of the gross income; that in the year 1871 the average cost per mile for running the trains was \$1.21, and the operating expenses absorbed sixty-six per cent. of the gross income. In the latter year our average receipts per passenger per mile were three and one-tenth cents against three and three-tenths cents in 1861, and our average charges per ton of freight carried one mile in 1871, were four and five-tenths cents against five cents in 1861.

The business of 1861 is selected for comparison with that of 1871 for the sake of having an even decade; the results would have been no less favorable if the business for 1859 or 1860 had been taken. These figures certainly do not accord with the prevalent impression that the railroad tariffs on both freight and passengers were higher, on an average, in 1871, than they were before the war.

There is one other point in our case to which I ask your attention in comparing the rates of local freight charges on different roads. Our road is fifty miles long. While it does an aggregate business which is respectable in amount, very little of the freight traffic is of a strictly local character, more than seven-eighths of it being carried to and from other roads. Moreover, what there is of the local freight goes but short distances, as from Chicopee to Springfield, three and one-half miles, and Springfield to Holyoke, eight miles. Fifty cents per ton between Springfield and Chicopee would be at the rate of fourteen cents per mile, while \$1.50 per ton for the entire length of the road would be at the rate of three cents per mile. It follows that the "average rate of freight per ton per mile" on our road will appear high, as compared with that of a road on which the transportation is for greater distances.

Respectfully submitted,

D. L. HARRIS, *President.*

RATES FOR TRANSPORTATION ON THE CONNECTICUT RIVER RAILROAD.

*Passengers.**

	Highest.	Lowest.
Rates per mile from station at Springfield,—	Cents.	Cents.
For the shortest distance passengers were carried, in 1869,	3	1 $\frac{3}{5}$
" " " " " " in 1871,	3	1 $\frac{3}{5}$
For distances more than 5 and less than 15 miles, in 1869,	3 $\frac{3}{4}$	0.92
" " " " " " in 1871,	3 $\frac{3}{4}$	0.92
For distances more than 15 and less than 30 miles, in 1869,	3 $\frac{3}{4}$	0.46
" " " " " " in 1871,	3 $\frac{3}{4}$	0.46
For distances more than 30 and less than 50 miles, in 1869,	3 $\frac{3}{4}$	0.45
" " " " " " in 1871,	3 $\frac{3}{4}$	0.45
For distances more than 50 and less than 100 miles, in 1869,	—	—
" " " " " " in 1871,	—	—
Rate per mile the whole length of main line in Massachusetts, in 1869,	3 $\frac{3}{4}$	0.45
Rate per mile the whole length of main line in Massachusetts, in 1871,	3 $\frac{3}{4}$	0.45
Rate per mile for <i>through</i> passengers passing over the line to or from points on other roads within or beyond the State, in 1869,	3 $\frac{3}{4}$	1.80
Rate per mile for <i>through</i> passengers passing over the line to or from points on other roads within or beyond the State, in 1871,	3 $\frac{3}{4}$	1.80

* October 1, 1871, local passenger tariff reduced to 3 $\frac{1}{2}$ cents per mile.

Freight.

	First Class.	Second Class.	Third Class.	Fourth Class.	Coal.
Highest rate per ton per mile from Springfield, including station charges,—	Cents.	Cents.	Cents.	Cents.	Cents.
For shortest distance freight was car- ried, in 1869,	28	22	17	17	12
For shortest distance freight was car- ried, in 1871,	28	22	17	17	12
For distances more than 5 and less than 15 miles, in 1869,	13 3	10.7	9.3	8	5
For distances more than 5 and less than 15 miles, in 1871,	12	10.6	8	6.6	5
For distances more than 15 and less than 30 miles, in 1869,	13.5	10	8.5	7 8	5
For distances more than 15 and less than 30 miles, in 1871,	10.7	8.5	7.8	7.1	5
For distances more than 30 and less than 50 miles, in 1869,	10	7.6	7.2	6.4	3
For distances more than 30 and less than 50 miles, in 1871,	8.4	7.2	5.6	4.8	3
For distances more than 50 and less than 100 miles, in 1869,	—	—	—	—	—
For distances more than 50 and less than 100 miles, in 1871,	—	—	—	—	—
For the whole length of main line in Massachusetts, in 1869,	10	7.6	7.2	6.4	3
For the whole length of main line in Massachusetts, in 1871,	8 4	7 2	5.6	4.8	3

EASTERN RAILROAD COMPANY.

OFFICE EASTERN RAILROAD COMPANY, CAUSEWAY STREET, }
BOSTON, November 21, 1871. }

To Massachusetts Railroad Commissioners.

GENTLEMEN:—The only change made in the passenger tariff the past year is from Boston to Everett. The former fare was 10 cents regular, and commuted 8 cents. The price now is 8 cents regular, and 6½ commuted. I append a statement of three months' receipts in 1870 and 1871:—

Statement.

	1870.			1871.		
	Regular.	Commuted.	Amount.	Regular.	Commuted.	Amount.
July, . .	1,089	5,060	\$513 70	1,568	8,190	\$657 79
August, .	1,191	5,060	523 90	1,312	8,310	671 35
September,	944	5,120	504 00	1,400	9,830	750 95
	3,224	15,240	\$1,541 60	4,280	26,330	\$2,080 09
Gain, . .	. . .	. . .	. . .	1,056	11,090	\$538 49

Very respectfully, yours,

GEO. RUSSELL, *General Agent.*

FITCHBURG RAILROAD COMPANY.

Boston, November 1, 1871.

J. C. CONVERSE, Esq., C. F. ADAMS, Jr., Esq., *Railroad Commissioners for State of Massachusetts.*

GENTLEMEN:—In reply to your circular of September 30, 1871, and its several interrogatories respecting the business of the Fitchburg Railroad, I would submit the following:—

1. The local tariffs now in force upon this road were originally established as follows:

Freight tariff,	. . . .	September, 1870.
Coal	"	May, 1871.
Passenger "	. . . .	May, 1871.

2. No partial revisions of tariffs have been made.

3. Our freight tariff was revised September, 1870, and rates on the following articles were reduced:—Apples, axes, boxes and crates (empty), brick (pressed), burial cases, clothing, carpeting, congress water, combs, copper, cordage, drain pipe, feed, fertilizers, flour in bags, fruits, new furniture, bedsteads, gas pipe, gunny bags, handles, japan ware, jute, leather, lemons, limes, lumber, logs, piles, ship timber, shingles, laths, clapboards, onions, oil (coal and kerosene), oranges, paints, paper stock, paper manufactured, paper hangings, roofing paper, pickles, palm-leaf hats, phosphate of lime, posts and rails, rags, safes, straw hats, turnips, drain tile, vegetables, waste cotton and woollen for paper stock, and coal.

The rates on two articles, boats and granite, have been slightly increased.

The reductions were made not by entirely altering the tariff rates,

but by changing the various articles from a higher to a lower class of freight, as from first class to second, or second to third.

Our passenger tariff was revised in May, 1871. The reduction on single fares was about one and one-half per cent., that on package tickets about four and one-half per cent., and that on season tickets about nine per cent.

4. I cannot state what amount in money such increase or reduction was supposed to represent.

5. The effect of such increase or reduction upon the business, gross receipts, and net earnings of the road is a difficult question to answer satisfactorily. The business of railroads is affected by so many causes that one cannot always trace the effect of special action upon the general business of a road.

6. The tariff on coal has been reduced from ten to twenty per cent., and the reduction has been followed by a reduced business. Rates have also been reduced on various other raw materials for manufacture, such as copper, jute, leather, lumber, logs, piles, ship timber, shingles, laths, clapboards, paper stock, fertilizers, and other articles as specified in answer to the third inquiry. We cannot, however, give any reliable opinion, regarding the effect of these reductions, in stimulating the business of our road.

Respectfully,

WM. B. STEARNS,
President Fitchburg Railroad Co.

In another communication Mr. Stearns wrote as follows:—

Our local passenger tariffs have been repeatedly reduced during the past few years, the last reduction having been made in May, 1871, and we believe our present local passenger rates are as low, if not lower, than those of any other Boston railroad. The rates on our through business, both for passengers and freight, were materially reduced on the first of last June. As connected with this matter, I would also say, that table No. 5 in your last annual report to the legislature shows that the passenger rates of the Fitchburg Railroad have for the last nine years been lower than those charged by most of the other Boston railroads. The number of our passenger trains has also been largely increased, adding materially to the expenditures for this branch of the business. It is perfectly true that a portion of the national taxes have been removed; yet the other taxes imposed since the commencement of the war are still continued. The taxes paid by this company in 1860 were \$3,995.27, while those already payable for 1871 amount to \$71,314.47, showing an increase of \$67,319.20.

Our directors consider that they had, by reducing their passenger and freight tariffs, already virtually complied with the suggestions contained in your circular some months before it was issued, and do not therefore feel that they should be expected to make another general reduction at the present time, while they are making very large expenditures for the reception of the business from the Tunnel line, which will probably yield little or no profit for nearly two years.

Respectfully yours,

WM. B. STEARNS,
President Fitchburg Railroad Co.

We annex accurate schedule of distances to all the points on our trunk line between 5 and 15 miles distance from Boston, with the single fare rates for 1869 and 1871, by which it appears, that in several instances, single fares are less than 2½ cents a mile.

	Miles.	1869.		1871.	
		Fare.	Rate per Mile.	Fare.	Rate per Mile.
		Cents.	Cents.	Cents.	Cents.
Belmont,	6 47	17	2.627	15	2.319
Waverly,	7 44	20	2.836	15	2.016
Waltham,	9 86	25	2.537	25	2.537
Stony Brook,	12 28	30	2.444	30	2.444
Weston,	13 19	35	2.654	35	2.654
Watertown (Branch), . .	7.96	15	1.885	15	1.885

Yours, respectfully,

WM. B. STEARNS, *President.*

RATES FOR TRANSPORTATION ON THE FITCHBURG RAILROAD.

Passengers.

	Highest.	Lowest.
Rate per mile from station in Boston,—	Cents.	Cents.
For the shortest distance passengers were carried, in 1869,	2.85	1 82
“ “ “ “ “ “ in 1871,	2 85	1 82
For distances more than 5 and less than 15 miles, in 1869,	2 50	1.08
“ “ “ “ “ “ in 1871,	2.50	1.03
For distances more than 15 and less than 30 miles, in 1869,	3	0.85
“ “ “ “ “ “ in 1871,	3	0.73
For distances more than 30 and less than 50 miles, in 1869,	3 10	0.64
“ “ “ “ “ “ in 1871,	2.77	0 51

Passengers—Concluded.

	Highest.	Lowest.
For distances more than 50 and less than 100 miles, in 1869,	Cents. —	Cents. —
“ “ “ “ “ in 1871,	—	—
Rate per mile the whole length of main line in Massachusetts, in 1869,	3.10	0 64
Rate per mile the whole length of main line in Massachusetts, in 1871,	3	0.51
Rate per mile for <i>through</i> passengers passing over the line to or from points on other roads within or beyond the State, in 1869,	2.20	—
Rate per mile for <i>through</i> passengers passing over the line to or from points on other roads within or beyond the State, in 1871,	2	—

Freight.

	First Class.	Second Class.	Third Class.	Fourth Class.	Coal.
Highest rate per ton per mile from Charlestown,—	Cents.	Cents.	Cents.	Cents.	Cents.
For shortest distance freight was carried, in 1869,	20	18	17	14	28
For shortest distance freight was carried, in 1871,	20	18	17	14	24
For distances more than 5 and less than 15 miles, in 1869,	13	12.2	10.6	9 8	9.5
For distances more than 5 and less than 15 miles, in 1871,	13	12.2	10.6	9.8	9.5
For distances more than 15 and less than 30 miles, in 1869,	8.8	8	6.4	5.6	5.6
For distances more than 15 and less than 30 miles, in 1871,	8.8	8	6.4	5.6	4.6
For distances more than 30 and less than 50 miles, in 1869,	7.2	6.4	5.6	3.4	3.3
For distances more than 30 and less than 50 miles, in 1871,	7.2	6.4	5 6	3.4	3
For distances more than 50 and less than 100 miles, in 1869,	—	—	—	—	—
For distances more than 50 and less than 100 miles, in 1871,	—	—	—	—	—
For the whole length of main line in Massachusetts, in 1869,	7.2	6.4	5.6	3.4	3.3
For the whole length of main line in Massachusetts, in 1871,	7.2	6.4	5.6	3.4	3

NEW BEDFORD & TAUNTON RAILROAD.

Date of tariffs now in force:—Passenger, October 1, 1870; freight, July 10, 1871. Passenger reduction, $31\frac{3}{10}$ per cent.

Freight.—No reduction on 1st and 2d classes; have added 3d class in quantities of 2,000 lbs., and a 4th class in quantities of 12,000 lbs.

NEW BEDFORD & TAUNTON RAILROAD, SUPERINTENDENT'S OFFICE, }
NEW BEDFORD, November 30, 1871. }

WM. A. CRAFTS, Clerk R. R. Commissioners, Boston.

DEAR SIR:—Yours of the 30th received. In reply, will say that we do not now make any deduction from tariff rates. On our former tariff there were but two classes, 1st and 2d, and we then made a discount of 20 per cent. to most of the manufacturing establishments here, not only upon the raw material but upon the goods manufactured. The same thing is now accomplished by the 4th class; only, instead of confining it to manufacturing establishments, it is open to any one who sends 12,000 lbs. at one time.

The purpose and object of the discount was and is to encourage and promote manufacturing; because every manufacturing establishment in operation here not only requires the transportation of the raw material used *in* and its production *out*, but it adds to the population and prosperity of the city, and thereby increases the travel upon the road.

Yours truly,

WARREN LADD, *Sup't.*

RATES FOR TRANSPORTATION ON THE NEW BEDFORD &
TAUNTON RAILROAD.

Passengers.

	Highest.	Lowest.
Rate per mile from station at New Bedford,—	Cents.	Cents.
For the shortest distance passengers were carried, in 1869,	$8\frac{1}{3}$	—
“ “ “ “ “ “ in 1871,	5	—
For distances more than 5 and less than 15 miles, in 1869,	$4\frac{2}{3}$	$1\frac{3}{4}$
“ “ “ “ “ “ in 1871,	$3\frac{3}{4}$	$1\frac{3}{4}$
For distances more than 15 and less than 30 miles, in 1869,	$3\frac{3}{4}$	$1\frac{7}{8}$
“ “ “ “ “ “ in 1871,	$3\frac{1}{4}$	$1\frac{5}{8}$
For distances more than 30 and less than 50 miles, in 1869,	—	—
“ “ “ “ “ “ in 1871,	—	—

Passengers—Concluded.

	Highest.	Lowest.
For distances more than 50 and less than 100 miles, in 1869,	Cents. —	Cents. —
“ “ “ “ “ in 1871,	—	—
Rate per mile the whole length of main line in Massachusetts, in 1869,	3 $\frac{3}{4}$	1 $\frac{7}{8}$
Rate per mile the whole length of main line in Massachusetts, in 1871,	3 $\frac{1}{4}$	1 $\frac{5}{8}$
Rate per mile for <i>through</i> passengers passing over the line to or from points on other roads within or beyond the State, in 1869,	5 $\frac{87}{100}$	1 $\frac{87}{100}$
Rate per mile for <i>through</i> passengers passing over the line to or from points on other roads within or beyond the State, in 1871,	5 $\frac{1}{10}$	1 $\frac{87}{100}$

Freight.

	First Class.	Second Class.	Third Class.	Fourth Class.	Coal.
Highest rate per ton per mile from New Bedford,—	Cents.	Cents.	Cents.	Cents.	Cents.
For shortest distance freight was carried, in 1869,	14 $\frac{3}{7}$	11 $\frac{3}{7}$	—	—	—
For shortest distances freight was carried, in 1871,	14 $\frac{3}{7}$	11 $\frac{3}{7}$	—	—	—
For distances more than 5 and less than 15 miles, in 1869,	11 $\frac{3}{7}$	8 $\frac{4}{7}$	—	—	—
For distances more than 5 and less than 15 miles, in 1871,	11 $\frac{3}{7}$	8 $\frac{4}{7}$	7 $\frac{6}{7}$	5 $\frac{5}{7}$	—
For distances more than 15 and less than 30 miles, in 1869,	10	7	—	—	—
For distances more than 15 and less than 30 miles, in 1871,	10	7	6 $\frac{1}{2}$	5	—
For distances more than 30 and less than 50 miles, in 1869,	—	—	—	—	—
For distances more than 30 and less than 50 miles, in 1871,	—	—	—	—	—
For distances more than 50 and less than 100 miles, in 1869,	—	—	—	—	—
For distances more than 50 and less than 100 miles, in 1871,	—	—	—	—	—
For the whole length of main line in Massachusetts, in 1869,	10	7	—	—	—
For the whole length of main line in Massachusetts, in 1871,	10	7	6 $\frac{1}{2}$	5	—

NEW HAVEN & NORTHAMPTON COMPANY.

NEW HAVEN & NORTHAMPTON COMPANY,
(General Offices, Tradesmen's Bank Building, 271 Chapel Street.) }
NEW HAVEN, CONN., November 29, 1871. }

Messrs. J. C. CONVERSE, and C. F. ADAMS, Jr., *General Railroad Commissioners.*

GENTLEMEN:—In answer to your inquiries as to the action of the company relative to your circular, dated Sept. 30, I have to say—

1st. The freight tariff in use by this company Sept. 30th was dated July 1, 1869, and at the time of its issue was a reduction of about 25 per cent. on the tariff fixed by the lessees of our road in Connecticut.

2d. No partial revisions have been made from July 1st, 1869, to Sept. 30th, 1871.

3d. Nov. 1st, 1871, we issued a new freight tariff for our road, making a reduction of about 20 per cent. on all rates to and from New York and New Haven to stations in Massachusetts, and a corresponding reduction on local rates. Coal rates have been reduced since June 1st 40 cents per ton to all stations over 60 miles from New Haven, and 20 cents per ton on all stations over 30 miles from New Haven. As to the effect of reductions, I will refer to the business of Holyoke, where we have lately opened a branch of our road, and where paper is largely manufactured. The rates to and from New York by the Connecticut River Railroad at the time our road was commenced, were about (\$1.00) one dollar per ton more than the rates we have established. The manufacturers there have claimed that high rates of freight prevented an expansion of business which would otherwise have taken place. Since the branch road and lower rates of freight have become certain, several paper mills have been commenced, and other branches of manufacture are building. Whether this is the result of the reductions in freight tariff, or the natural growth of the country, I am not prepared to state.

I do not believe that a reduction in railway charges will *invariably* increase the receipts or even the business of a road. Much depends on the location of the road, the character of its business, and the occupation of the citizens along its line. If the road runs from a large city, where houses and the cost of living are higher than in the country towns, a low rate of passenger fare will doubtless induce many to remove to small towns and villages, to live. But on a line of railway running to and from inland towns and cities, it will not much affect the business of the road whether the

fares are more or less, to a reasonable extent. The farmer or the manufacturer will not ride over a railroad, simply because it is cheap, but only when their business calls. And the receipts of roads so situated will only increase as the population increases on its line.

Our company recognizes the fact that as the business of the road increases in volume that it can do it for a less charge; but, at the same time, we must charge enough on the existing business to pay operating expenses, interest on debts, and capital.

In arranging our last freight tariff, to take effect Nov. 1, 1871, we have considered the business on the line of the road as a whole, and made our charges more on a basis of the situation of the manufacturers rather than distances transported. For instance, take the paper manufacturers situated on our road at Unionville, Westfield, Holyoke, and Northampton: they all buy stock in Boston and New York, and sell their paper in the same markets, and each can afford to pay as much as any one, and no more; therefore, we have fixed the rates about the same to all the points to and from New York, and as low as we can reasonably do the whole business.

We expect soon to reduce our passenger rates, now $3\frac{1}{2}$ cents per mile, to 3 cents per mile; but I do not think it will increase the travel on our road to any extent.

As to the question, what amount in money the reduction in passenger and freight tariff was supposed to represent, I can only estimate, but should think \$50,000 to \$75,000 per annum.

Yours very truly,

CHAS. N. YEAMANS, *Vice-President.*

RATES FOR TRANSPORTATION ON THE NEW HAVEN AND NORTHAMPTON RAILROAD.

*Passengers.**

	Highest.	Lowest.
Rate per mile from station at Northampton,—	Cents.	Cents.
For the shortest distance passengers were carried, in 1869,	4	3
“ “ “ “ “ in 1871,		
For distances more than 5 and less than 15 miles, in 1869,	$3\frac{8}{10}$	$3\frac{1}{2}$
“ “ “ “ “ in 1871,		
For distances more than 15 and less than 30 miles, in 1869,	$3\frac{3}{4}$	$3\frac{1}{2}$
“ “ “ “ “ in 1871,		
For distances more than 30 and less than 50 miles, in 1869,	$3\frac{1}{2}$	$3\frac{1}{2}$
“ “ “ “ “ in 1871,		

* All short fares are made as near $3\frac{1}{2}$ cents per mile, and all through fares as near 3 cents as can be, and make even 5 cents.

Passengers—Concluded.

	Highest.	Lowest.
For distances more than 50 and less than 100 miles, in 1869, }	Cents. 3½	Cents. 3½
“ “ “ “ “ “ in 1871, }		
Rate per mile the whole length of main line in Massachusetts, in 1869,	3½	3½
Rate per mile the whole length of main line in Massachusetts, in 1871,	3½	3½
Rate per mile for <i>through</i> passengers passing over the line to or from points on other roads within or beyond the State, in 1869,	3½	3½
Rate per mile for <i>through</i> passengers passing over the line to or from points on other roads within or beyond the State, in 1871,	3½	3½

Freight.

	First Class.	Second Class.	Third Class.	Fourth Class.	Coal.
Highest rate per ton per mile from New Haven, Conn.,—	Cents.	Cents.	Cents.	Cents.	Cents.
For shortest distance freight was carried, in 1869,	18½	14½	11½	9½	—
For shortest distance freight was carried, in 1871,					
For distances more than 5 and less than 15 miles, in 1869,	14½	11½	9½	7½	—
For distances more than 5 and less than 15 miles, in 1871,					
For distances more than 15 and less than 30 miles, in 1869,	11½	8½	7½	6½	—
For distances more than 15 and less than 30 miles, in 1871,					
For distances more than 30 and less than 50 miles, in 1869,	8½	7½	5½	4½	—
For distances more than 30 and less than 50 miles, in 1871,					
For distances more than 50 and less than 100 miles, in 1869,	6½	5½	4½	3½	2½
For distances more than 50 and less than 100 miles, in 1871,					
For the whole length of main line in Massachusetts, in 1869,	8½	8½	7½	5½	—
For the whole length of main line in Massachusetts, in 1871,					

OLD COLONY & NEWPORT RAILWAY COMPANY.

OFFICE OF THE OLD COLONY & NEWPORT RAILWAY Co., }
BOSTON, MASS., December 23, 1871. }

To the Board of Railroad Commissioners.

GENTLEMEN:—In answer to your circular of Sept. 30th, I send the enclosed papers, marked A to G, containing the information sought in questions one to six inclusive of that circular. I also enclose tables giving the rates for transportation on the Old Colony & Newport and South Shore Railroads, filled out as you request.

So far as I understand the purpose of your circular, these papers give all the information desired, except as to the *effect* which the reduction of rates has had upon the business, gross receipts and earnings of the roads.

I have given much time and labor to an examination of these papers, but the character of the investigation asked is such, and the analysis so intricate, that I am unable to state results satisfactory to myself.

The following facts are shown from the papers:—In 1859 a passenger tariff was adopted, which was increased in 1864, and remained unaltered until 1867, when an average reduction was made of about $7\frac{3}{10}$ per cent. Since that time further reductions have been made, reducing the passenger tariff of 1871 $8\frac{4}{10}$ per cent. below that of 1867, and $15\frac{7}{8}$ per cent. below that of 1864.

A new passenger tariff has been adopted, to take effect January 1, 1872, reducing the maximum rate on local business to three cents per mile, and the average rate to $2\frac{1}{10}$ cents per mile.

The average rate from connecting roads is now $1\frac{62}{100}$ cents per mile, including season tickets.

The reduction from the passenger tariff of 1866 (estimating for an equal amount of business) would amount to \$81,425.41 on the business of 1866; while the increase of receipts in 1871 over 1866 on local business is \$182,668.97. The amount of these two sums, \$264,094.38, gives the apparent effect of the reduction of rates from 1866 to 1871.

The reductions from 1869 to 1871, estimated in the same manner, are equal to \$54,784.70 on the business of 1869; while the increase of receipts of 1871 over 1869 is \$50,206.81. The amount of these two sums, \$104,991.51, gives the apparent effect of the reductions of rates from 1869 to 1871.

I presume the greatest effect of reductions in rates would be shown in the short travel near Boston, and here our largest reductions have been made.

Between Boston and South Braintree, from 1866 to 1871, large reductions were made, estimated at about 33 per cent., upon the average, from the tariff of 1866.

The larger part of this reduction was made on Jan. 1, 1871, and sufficient time has not elapsed to see its full effect. The receipts from business between Boston and South Braintree and intermediate stations were, in 1866, \$102,598.60; in 1869, \$150,241.73; in 1870, \$156,555.32; and in 1871, \$163,826.92. The gain in receipts in 1871 over 1870 was \$7,274.60, or about 4 per cent. The average reduction in rates in 1871 from 1870 is estimated at 24 per cent.

These results are obtained from the same length of road operated in the different years. But it may be observed that in 1868 the horse railroad to Quincy was discontinued, and in the same year, to meet the public demand, trains were run on Sunday between Boston and South Braintree,—three trains in each direction,—which have been continued to the present time.

Between Boston and Wollaston Heights the number of passengers has increased from 12,793 in 1869 to 48,270 in 1871, and the receipts from \$2,099.50 to \$6,399.91; while the rates have been reduced about 33 per cent. on single tickets, 25 per cent. on package, and 6 per cent. on season tickets.

The nominal reduction in tariff rates on freight has been about $6\frac{1}{4}$ per cent. since the tariff adopted in 1866 and revised in 1868. But an actual reduction considerably greater has been made by the transfer of many of the leading articles of consumption, and those used in creating motive power, and in building and manufactures, comprising flour, grain, potatoes, apples, coal, wood, lumber, stone, brick, lime, cement, sand, slate, pig and scrap iron, ore, cotton, hemp, wool, tar, rosin, spelter, &c., &c., from the first and second classes of the tariff to the third class; and when in large quantities, to special rates less than third class. It would be very difficult to give accurately the amount of reductions thus made upon each of these articles, which constitute nearly one-third the tonnage of the road.

A reduction of $6\frac{1}{4}$ per cent. from the freight tariff of 1866, is equal to \$13,489.61 on the local business of that year, which was \$215,824.18, while in 1871, the local receipts from freight were \$362,532.04, an increase of \$146,707.86. The amount of these two sums, \$160,196.87, or about $74\frac{1}{4}$ per cent. gives the apparent effect of the reduction in rates. In 1868 the local tonnage to and from Boston, was 117,879 $\frac{1}{4}$ tons, from which the receipts were \$205,755.15. In 1871 the tonnage was 158,156 $\frac{1}{2}$ tons, from which the receipts were \$263,005.40, showing an increase of about 34 per cent. in ton-

nage, and about 28 per cent. in receipts. The results are somewhat affected by the fact that 1871 more freight was hauled for short distances than 1869 — particular attention having been given to carrying freight between Boston and the neighboring towns.

The gross receipts of the road for the year ending May 31, 1865, were \$1,061,521.13, while for the year ending Sept. 30, 1871, they were \$1,671,478.51, an increase of \$609,957.38, or about 57½ per cent.

But while these results have followed the reduction of rates which have been mentioned, it is questionable how far they have been produced by them. Many other causes have coöperated to increase the business and receipts of the road during the same time. The general increase of business caused by the development and growth of the country through which the road runs, and a similar increase and development of business upon the lines of connecting roads, have done much to produce these results. The policy and efforts of the corporation have been directed to the same end.

By the construction of branch roads, about thirty-eight miles of new road have been added to the line since 1865.

In the construction and equipment of these branches, the rebuilding and enlargement of depots on the main line, and increase of rolling stock and terminal facilities, over three millions of dollars have been expended since 1865. The number of passenger trains to and from Boston has increased from forty-four, running 349,679 miles in 1865, to seventy-eight, running 664,179 miles in 1871. And many of these are run at much higher rates of speed than formerly. The improvement of the road and its equipment and facilities for doing business, by the expenditure of this large sum derived from increase of capital and not from earnings, together with the reasons stated, and others which might be named, have probably contributed as much as the reduction of rates to increase the business of the road and to swell the amount of its gross receipts. The increase in business has, thus far, scarcely kept pace with the increase in expenditures for its accommodation. So that the stockholders of the corporation have, as yet, received no adequate compensation for their investment.

In your circular of August 10, enclosed in that of September 30, certain statements and suggestions are made for which you request special consideration and an expression of opinion thereon. In reply to the suggestion that fares and freight should be reduced on account of the reduced cost of operating the roads, I would say that from my experience on the roads with which I am connected, this cost is, as a whole, not less than at any previous time.

It is obvious from the foregoing remarks that the statement in this circular "that the rates were largely increased during the war, and have not since been reduced," does not apply to the Old Colony & Newport Railway and its branches. Its rates were not largely increased then, and they are now, on an average, lower than ever before. Nor does the statement that the "roads have been relieved from the payment of large taxes," apply to this road. This corporation paid in taxes in 1865, \$65,706.82, and has during the past year paid \$76,400.73, which is 18½ per cent. of its net income, and has been exceeded only in the years 1867, 1868 and 1870, and then by an inconsiderable amount.

Neither can the suggestion that the reduction of rates should be large, so as to stimulate industry and business, apply with any force to this road; as the great centres of industry upon its line are also accommodated by water transportation, giving cheaper transportation for those heavy articles of prime necessity than a railroad can furnish.

The statement that "the roads have added and are now adding immensely to the value of their properties out of their net earnings," cannot apply to this road. While it has been the policy of its managers to fully keep up its property out of its earnings, all additions and improvements have been made from additional capital. And its net earnings have not increased in proportion to the increase of its capital. This increased investment of capital has been made by the managers of this corporation in the belief that increased facilities would build up, attract and create business. During the past five years they have exercised every ingenuity to increase the business of the road, primarily for their own benefit, but believing also that this increase of business was co-incident with the development of the industrial interests of the towns and cities upon its line. While the returns to its stockholders have been small, the increase in the value of property in the cities and towns has been large; and it has contributed its full share to the advance in the value of real estate in Boston, which has enabled its owners without effort of their own to more than quadruple their rentals.

If, as is stated by you, the rates of transportation have not been reduced since 1860, it is well to bear in mind the fact that there is scarcely a single commodity in the market, produced by the joint effort of labor and capital, which can, to-day, be purchased at less than an advance of 50 per cent. on its cost in 1860. If then transportation is no higher than in 1860, it is in comparison with the value of money and other commodities, one-third less than it was then.

There is one other fact of great moment, which should be carefully weighed in the consideration of this question of reduction of rates :

The public demand upon the railroad corporations during the past ten years for improved accommodations has been constant, and the managers of this corporation have endeavored to meet it. The increase in the number of our trains has been very great. The increased speed demanded for express trains has been attended by greatly increased expense,—requiring more perfect and costly engines; more substantial road beds and tracks; more watchful care in the operation of the road,—in a word, an increased expense in all the materials and labor used and employed by the corporation.

The improvements in the cars alone, during the past ten years, have been very great and made at great cost. Our stations have been rebuilt and greatly improved. I think I speak within bounds in saying that if the public upon the line of this road would be satisfied to-day with the accommodations in trains, cars and stations furnished in 1860, the corporation would be the gainer in furnishing such accommodations at rates one-third less than those now charged.

In my view, speaking with the experience of a life-time in railroad management, there is great danger to the public interests in endeavoring to unduly force down rates of fares and freights upon railroads. Our railroads are yet far from perfect; great expenditures of capital must yet be made upon the existing roads, to enable them to render the highest service to the public of which they are capable. Branches must be built, to the expense of which the main lines must contribute. In my judgment, if the feelings of which you speak as existing “in the popular mind and in the legislature,” upon the subject of “proper concessions by the railroad corporations,” lead to an unreasonable restraint upon the power given to railroad corporations to fix their own fares and freights, the result will be disastrous. The prosperity of railroads is dependent upon and coincident with the growth and prosperity of the community they serve. Hence, self-interest will induce them to make their rates as favorable to the business on their lines as circumstances will allow.

The investment of capital in railroads has been of untold benefit to the people of this Commonwealth, while it has hitherto made but moderate returns to its owners.

The roads have been in general economically built and carefully managed. As yet, they have not returned to their builders the ordinary interest of money invested in other pursuits. No one, to my knowledge, has ever paid continuously the ten per cent. contem-

plated in their charters. If the legislature has the power which is claimed, to arbitrarily reduce rates in spite of the provisions of charters, it may exact cheap transportation, but with it will obtain cheap accommodations.

In my judgment there can be no greater injury to the public interests, than such a reduction of rates as will take from railroad corporations fair expectations of paying a reasonable return for the capital which they employ. It must prevent the further investment of capital in the extension of lines which are necessary to make the system co-extensive with the public needs, and it will check that expenditure which is equally necessary to improve and perfect the existing lines. Very respectfully,

ONslow STEARNS, *President.*

RATES FOR TRANSPORTATION ON THE OLD COLONY & NEW-
PORT RAILWAY.

Passengers.

	Highest.	Lowest.
	Cents.	Cents.
Rate per mile from station in Boston,—		
For the shortest distance passengers were carried, in 1869,	4.5	3.2
“ “ “ “ “ “ in 1871,		
For distances more than 5 and less than 15 miles, in 1869,	3	1
“ “ “ “ “ “ in 1871,	2.6	$\frac{98}{100}$
For distances more than 15 and less than 30 miles, in 1869,	3.5	$\frac{86}{100}$
“ “ “ “ “ “ in 1871,	3	$\frac{86}{100}$
For distances more than 30 and less than 50 miles, in 1869,	3	$\frac{64}{100}$
“ “ “ “ “ “ in 1871,	2.9	$\frac{64}{100}$
For distances more than 50 and less than 100 miles, in 1869,	2.7	$\frac{62}{100}$
“ “ “ “ “ “ in 1871,		
Rate per mile the whole length of main line in Massa- chusetts, in 1869,	2.7	$\frac{62}{100}$
Rate per mile the whole length of main line in Massa- chusetts, in 1871,		
Rate per mile for <i>through</i> passengers passing over the line to or from points on other roads within or beyond the State, in 1869,	2	$\frac{28}{100}$
Rate per mile for <i>through</i> passengers passing over the line to or from points on other roads within or beyond the State, in 1871,	2	$\frac{28}{100}$

*Freight.**

	First Class.	Second Class.	Third Class.	Fourth Class.	Coal.
Highest rate per ton per mile from Boston,—	Cents.	Cents.	Cents.	Cents.	Cents.
For shortest distance freight was carried, in 1869,	27½	12½	10	—	8
For shortest distance freight was carried, in 1871,					
For distances more than 5 and less than 15 miles, in 1869,	12⅔	6⅔	4⅔	—	3⅓
For distances more than 5 and less than 15 miles, in 1871,					
For distances more than 15 and less than 30 miles, in 1869,	7	5	3	—	2½
For distances more than 15 and less than 30 miles, in 1871,					
For distances more than 30 and less than 50 miles, in 1869,	7	5	3⅔	—	2⅔
For distances more than 30 and less than 50 miles, in 1871,					
For distances more than 50 and less than 100 miles, in 1869,	6⅔	4⅕	2⅔	—	2⅔
For distances more than 50 and less than 100 miles, in 1871,					
For the whole length of main line in Massachusetts, in 1869,	6½	4¼	3⅓	—	2⅔
For the whole length of main line in Massachusetts, in 1871,					

* In addition to the foregoing rates a terminal charge of 25 cents per ton is made for receiving or delivering freight.

*Travel and Receipts between Wollaston Heights and Boston for Years ending
September 30, 1869, 1870, and 1871.*

	SINGLE.		PACKAGE.		SEASON.		TOTAL.	
	Passen- gers.	Amount.	Passen- gers.	Amount.	Passen- gers.	Amount.	Passen- gers.	Amount.
1869, .	3,472	\$862 75	2,350	\$470 00	6,971	\$766 75	12,793	\$2,099 50
1870, .	4,289	1,072 68	13,770	1,754 00	6,615	727 75	24,674	3,574 43
1871, .	12,608	2,248 74	25,160	3,101 00	10,502	1,050 17	48,270	6,399 91

RATES FOR TRANSPORTATION ON THE SOUTH SHORE RAILROAD.

Passengers.

	Highest.	Lowest.
Rate per mile from station in Braintree,—	Cents.	Cents.
For the shortest distance passengers were carried, in 1869,	8.6	4.3
“ “ “ “ “ “ in 1871,	4.3	3.4
For distances more than 5 and less than 15 miles, in 1869,	3.4	1.2
“ “ “ “ “ “ in 1871,		
For distances more than 15 and less than 30 miles, in 1869,	—	—
“ “ “ “ “ “ in 1871,		
For distances more than 30 and less than 50 miles, in 1869,	—	—
“ “ “ “ “ “ in 1871,		
For distances more than 50 and less than 100 miles, in 1869,	—	—
“ “ “ “ “ “ in 1871,		
Rate per mile the whole length of main line in Massachusetts, in 1869,	3.4	1.2
Rate per mile the whole length of main line in Massachusetts, in 1871,		
Rate per mile for <i>through</i> passengers passing over the line to or from points on other roads within or beyond the State, in 1869,	3 $\frac{4}{100}$	1 $\frac{5}{100}$
Rate per mile for <i>through</i> passengers passing over the line to or from points on other roads within or beyond the State, in 1871,	2	$\frac{53}{100}$

*Freight.**

	First Class.	Second Class.	Third Class.	Fourth Class.	Coal.
Highest rate per ton per mile from Braintree,—	Cents.	Cents.	Cents.	Cents.	Cents.
For shortest distance freight was carried, in 1869,	97 $\frac{2}{7}$	44 $\frac{2}{7}$	34 $\frac{2}{7}$	—	27 $\frac{2}{7}$
For shortest distance freight was carried, in 1871,					
For distances more than 5 and less than 15 miles, in 1869,	13 $\frac{1}{23}$	7 $\frac{1}{23}$	6 $\frac{2}{23}$	—	4 $\frac{2}{23}$
For distances more than 5 and less than 15 miles, in 1871,					
For distances more than 15 and less than 30 miles, in 1869,	—	—	—	—	—
For distances more than 15 and less than 30 miles, in 1871,					
For distances more than 30 and less than 50 miles, in 1869,	—	—	—	—	—
For distances more than 30 and less than 50 miles, in 1871,					

* In addition to the foregoing rates a terminal charge of 25 cents per ton is made for receiving or delivering freight.

Freight—Concluded.

	First Class.	Second Class.	Third Class.	Fourth Class.	Coal.
	Cents.	Cents.	Cents.	Cents.	Cents.
For distances more than 50 and less than 100 miles, in 1869, . . .	-	-	-	-	-
For distances more than 50 and less than 100 miles, in 1871, . . .	-	-	-	-	-
For the whole length of main line in Massachusetts, in 1869, . . .	13 $\frac{1}{2}$	7 $\frac{1}{2}$	6 $\frac{2}{3}$	-	4 $\frac{2}{3}$
For the whole length of main line in Massachusetts, in 1871, . . .	13 $\frac{1}{2}$	7 $\frac{1}{2}$	6 $\frac{2}{3}$	-	4 $\frac{2}{3}$

In submitting the above very interesting communication from the president of the Old Colony Railway Co., the Commissioners wish to express their deep sense of its value to the community at large no less than to the other railroad corporations of this State and to the members of this Board. Upon some points of detail, as in the statement in relation to taxation, for instance, it may admit of criticism. As is perfectly well known, taxes formerly levied on stockholders individually are now paid for them collectively by the corporation, and the impression, apparently conveyed in one or two of the foregoing communications, that the change in the method of payment was an imposition of a wholly new tax, will hardly bear examination. The Commissioners feel no desire, however, to criticise in any way a statement made with such evident care, and evincing such thorough mastery of the subject, besides setting forth results so very creditable to the management of the corporation. In their report for 1871 the Commissioners gave their views as to the policy which might fairly be expected of railroad corporations, in these words:—"That policy should be a tentative but a persistent one,—a continual effort to see when and how and where any portion of the burden now pressing on industry could be so removed or so shifted as to enable production to expand, thus replacing in one direction what was conceded to it in another. The Commissioners call for no sacrifice of dividends; they do ask for a constant exercise of ingenuity and for a sacrifice of ease." A very excellent illustration of the steady pursuance of such a policy, and the excellent results flowing from it, is furnished in the foregoing

statement of the experience of the Old Colony & Newport Railway Co. It is full of instruction to all who feel an interest in the study of railroad development.

The Commissioners fully concur in the closing paragraphs of this communication. Any public measure of supposed railroad reform which results in hampering the development of the system or in alarming those who are disposed to invest capital in it, reacts with even more injurious effect upon the community than on the corporations themselves. Upon this subject, however, the Commissioners had already set forth their views in preparing Part III. of this Report, before the reply of President Stearns was received.

PROVIDENCE & WORCESTER RAILROAD.

PROVIDENCE & WORCESTER RAILROAD COMPANY, }
SUPERINTENDENT'S OFFICE, PROVIDENCE, December 14, 1871. }

Massachusetts Board of Railroad Commissioners, Boston, Mass.

GENTLEMEN:—Herewith enclosed I hand you circular with blanks filled as by your request. I also enclose our passenger and freight tariffs, last issue. We contemplate an immediate reduction in our rates of transportation, both passenger and freight, and shall give particular attention to the rates on coal, iron, sand, and articles analogous. We should have effected a reduction before this, but for the fact that our business has been in a great measure crowded into the closing months of the season, thereby rendering such reduction impracticable, except at the risk of creating more or less dissatisfaction.

It is well known that this road depends upon its local traffic for its strength and vitality, and that we are compelled to haul a large tonnage of dead weight through, to perform that service. Our through passenger business is not lucrative; and to earn the same amount received by other roads of same length from their through business, we are obliged to pick up and put down a passenger many times.

We have a heavy freight tonnage, both through and local, but a large portion of it is made up of a class of freight on which the most important reductions are advised and expected, and that at a time when we find expensive portions of the road want renewing, after being worn out in *building up the business*.

Our board of directors is made up almost wholly of men engaged in manufacturing along the line of the road; and it is safe to assume

that the interests of the public will not suffer by their action in fixing the rate of transportation.

Respectfully yours,

WM. D. HILTON, *Superintendent.*

1. The local freight and local passenger tariffs now in force upon this road were originally established—Passenger tariff, December 2, 1867; freight do., April 1, 1867.

RATES OF TRANSPORTATION ON THE PROVIDENCE & WORCESTER RAILROAD.

Passengers.

	Highest.	Lowest.
Rate per mile from station in Worcester,—	Cents.	Cents.
For the shortest distance passengers were carried, in 1869,	} 3	1 $\frac{72}{100}$
“ “ “ “ “ “ in 1871,		
For distances more than 5 and less than 15 miles, in 1869,	} 3 $\frac{46}{100}$	2 $\frac{60}{100}$
“ “ “ “ “ “ in 1871,		
For distances more than 15 and less than 30 miles, in 1869,	} 3 $\frac{58}{100}$	2 $\frac{80}{100}$
“ “ “ “ “ “ in 1871,		
For distances more than 30 and less than 50 miles, in 1869,	} 3 $\frac{65}{100}$	2 $\frac{78}{100}$
“ “ “ “ “ “ in 1871,		
For distances more than 50 and less than 100 miles, in 1869,	—	—
“ “ “ “ “ “ in 1871,	—	—
Rate per mile the whole length of main line in Massachusetts, in 1869,	} 3 $\frac{65}{100}$	2 $\frac{74}{100}$
Rate per mile the whole length of main line in Massachusetts, in 1871,		
Rate per mile for <i>through</i> passengers passing over the line to or from points on other roads within or beyond the State, in 1869,	—	—
Rate per mile for <i>through</i> passengers passing over the line to or from points on other roads within or beyond the State, in 1871,	3 $\frac{65}{100}$	—

Freight.

	First Class.	Second Class.	Third Class.	Fourth Class.	Coal.
Highest rate per ton per mile from Worcester,—	Cents.	Cents.	Cents.	Cents.	Cents.
For shortest distance freight was car- ried, in 1869,	} 21½	16½	13	11	—
For shortest distance freight was car- ried, in 1871,					
For distances more than 5 and less than 15 miles, in 1869,	} 13	12	9	6½	—
For distances more than 5 and less than 15 miles, in 1871,					
For distances more than 15 and less than 30 miles, in 1869,	} 9	8½	7	6¼	—
For distances more than 15 and less than 30 miles, in 1871,					
For distances more than 30 and less than 50 miles, in 1869,	—	—	—	—	—
For distances more than 30 and less than 50 miles, in 1871,	—	—	—	—	—
For distances more than 50 and less than 100 miles, in 1869,	—	—	—	—	—
For distances more than 50 and less than 100 miles, in 1871,	—	—	—	—	—
For the whole length of main line in Massachusetts, in 1869,*	—	—	—	—	—
For the whole length of main line in Massachusetts, in 1871,*	9	8½	7	6¼	—

Coal, Pig-Iron and Moulding Sand to Worcester.

In quantities over ten and less than five hundred gross tons at one ship- ment,	\$2 25
Over five hundred and less than five thousand gross tons per annum to one person or firm,	2 00
Over five thousand gross tons per annum to one person or firm,	1 75

The above rates cover wharfage at Providence, if landed at the Com-
pany's wharves.

* 26 miles.

TAUNTON BRANCH RAILROAD.

1. The local freight and local passenger tariffs now in force upon this road were originally established, or last generally revised April 1, 1856.
2. No change has been made.
3. No change.

RATES FOR TRANSPORTATION ON THE TAUNTON BRANCH RAILROAD.
Passengers.

	Highest.	Lowest.
Rate per mile from station at Taunton,—	Cents.	Cents.
For the shortest distance passengers were carried, in 1869,	5	$\frac{55}{100}$
“ “ “ “ “ “ in 1871,	5	$\frac{55}{100}$
For distances more than 5 and less than 15 miles, in 1869,	$3\frac{1}{4}$	$3\frac{2}{11}$
“ “ “ “ “ “ in 1871,	$3\frac{1}{4}$	$3\frac{2}{11}$
For distances more than 15 and less than 30 miles, in 1869,	—	—
“ “ “ “ “ “ in 1871,	—	—
For distances more than 30 and less than 50 miles, in 1869,	—	—
“ “ “ “ “ “ in 1871,	—	—
For distances more than 50 and less than 100 miles, in 1869,	—	—
“ “ “ “ “ “ in 1871,	—	—
Rate per mile the whole length of main line in Massachusetts, in 1869,	$3\frac{2}{11}$	$3\frac{2}{11}$
Rate per mile the whole length of main line in Massachusetts, in 1871,	$3\frac{2}{11}$	$3\frac{2}{11}$
Rate per mile for <i>through</i> passengers passing over the line to or from points on other roads within or beyond the State, in 1869,	$5\frac{7}{11}$	$1\frac{9}{11}$
Rate per mile for <i>through</i> passengers passing over the line to or from points on other roads within or beyond the State, in 1871,	$5\frac{2}{11}$	$1\frac{9}{11}$

Freight.

	First Class.	Second Class.	Third Class.	Fourth Class.	Coal.
Highest rate per ton per mile from Taunton,—	Cents.	Cents.	Cents.	Cents.	Cents.
For the shortest distance freight was carried, in 1869,	$8\frac{1}{4}$	$8\frac{1}{4}$	$8\frac{1}{4}$	$8\frac{1}{4}$	$7\frac{1}{4}$
For the shortest distance freight was carried, in 1871,	$8\frac{1}{4}$	$8\frac{1}{4}$	$8\frac{1}{4}$	$8\frac{1}{4}$	$7\frac{1}{4}$
For distances more than 5 and less than 15 miles, in 1869,	$9\frac{1}{11}$	—	—	$3\frac{3}{4}$	$4\frac{6}{11}$
For distances more than 5 and less than 15 miles, in 1871,	$9\frac{1}{11}$	—	—	$3\frac{3}{4}$	$4\frac{6}{11}$
For the whole length of main line in Massachusetts, in 1869,	$9\frac{1}{11}$	—	—	$3\frac{3}{4}$	$4\frac{6}{11}$
For the whole length of main line in Massachusetts, in 1871,	$9\frac{1}{11}$	—	—	$3\frac{3}{4}$	$4\frac{6}{11}$

A. E. SWASEY, *Superintendent.*

VERMONT & MASSACHUSETTS RAILROAD.

1. Freight tariff revised and rates reduced, October 1, 1870; passenger tariff revised, July 1, 1871. Rates not changed.

2. No partial revision except as above.

3. Reduction of freight about 7 per cent.; affects all classes.

4. Amount of reduction on freight about \$18,000.

5. The net earnings are about the same as before reduction.

6. No reductions on coal and raw materials.

Our passenger tariff will be revised, to take effect December 1, 1871, making rate $3\frac{1}{2}$ cents per mile for local business. The amount of such reduction of passenger fares, on business of the year ending September 30, would be \$25,469.25.

RATES FOR TRANSPORTATION ON THE VERMONT & MASSACHUSETTS RAILROAD.

Passengers.

	Highest.	Lowest.*
Rate per mile from station at Fitchburg,—	Cents.	Cents.
For the shortest distance passengers were carried, in 1869,	$7\frac{1}{2}$	$1\frac{6}{10}$
“ “ “ “ “ “ in 1871,	$7\frac{1}{2}$	$1\frac{6}{10}$
For distances more than 5 and less than 15 miles, in 1869,	4	$\frac{88}{100}$
“ “ “ “ “ “ in 1871,	4	$\frac{88}{100}$
For distances more than 15 and less than 30 miles, in 1869,	4	$\frac{88}{100}$
“ “ “ “ “ “ in 1871,	4	$\frac{88}{100}$
For distances more than 30 and less than 50 miles, in 1869,	4	$\frac{88}{100}$
“ “ “ “ “ “ in 1871,	4	$\frac{88}{100}$
For distances more than 50 and less than 100 miles, in 1869,	4	$\frac{88}{100}$
For distances more than 50 and less than 86 miles, in 1871,	4	$\frac{88}{100}$
Rate per mile the whole length of main line in Massachu-		
setts, in 1869,	4	—
Rate per mile the whole length of main line in Massachu-		
setts, in 1871,	4	—
Rate per mile for <i>through</i> passengers passing over the		
line to or from points on other roads within or beyond		
the State, in 1869,	3	—
Rate per mile for <i>through</i> passengers passing over the line		
to or from points on other roads within or beyond the		
State, in 1871,	3	—

* We sell about 400 season tickets per month, which pay us at the rate of 1.03 cents per mile.

Freight.

	First Class.	Second Class.	Third Class.	Fourth Class.	Coal.
Highest rate per ton per mile from Fitchburg,—	Cents.	Cents.	Cents.	Cents.	Cents.
For shortest distance freight was car- ried, in 1869, 2-miles,	50	40	30	30	30
For shortest distance freight was car- ried, in 1871, 2 miles,	50	40	30	30	30
For distances more than 5 and less than 15 miles, in 1869,	23	19	15	13	13
For distances more than 5 and less than 15 miles, in 1871,	20	17	15	13	13
For distances more than 15 and less than 30 miles, in 1869,	17	13 $\frac{2}{3}$	11	8	8
For distances more than 15 and less than 30 miles, in 1871,	15	12	10	8	8
For distances more than 30 and less than 50 miles, in 1869,	14	10 $\frac{3}{4}$	8 $\frac{2}{3}$	6	6
For distances more than 30 and less than 50 miles, in 1871,	11	9	8	5	5
For distances more than 50 and less than 86 miles, in 1869,	10 $\frac{2}{3}$	8 $\frac{2}{3}$	7	4	4
For distances more than 50 and less than 86 miles, in 1871,	9	7 $\frac{2}{3}$	6 $\frac{2}{3}$	4	4
For the whole length of main line in Massachusetts, in 1869, 86 miles, .	10	8	7	3 $\frac{2}{3}$	3 $\frac{2}{3}$
For the whole length of main line in Massachusetts, in 1871, 86 miles, .	8 $\frac{2}{3}$	7	6	3 $\frac{2}{3}$	3 $\frac{2}{3}$

It is a very noticeable fact in connection with the replies to the circular of August 10th, that the heaviest proportionate reductions during the year have apparently been made by corporations paying either no dividends at all or very reduced dividends. The Vermont & Massachusetts, for instance, reports for the year an estimated reduction of \$44,000;—this road, however, has during the last ten years averaged less than one per cent. of annual dividends to its stockholders. The Cheshire, again, has during the same time averaged dividends of but 2 $\frac{1}{2}$ per cent.;—yet during the last eighteen months it reports three considerable tariff reductions, two as regard passengers, and one as regards freight. The New Haven & Northampton, finally, is a road paying no dividends at all, but regularly diverting all surplus earnings to construction. This corporation, however, reports a reduction for the year estimated at not less than \$50,000, or over 9 per cent. on its gross earnings for 1871. Should this

not prove a very decided overestimate it would follow that this corporation has, in proportion to its means, made a heavier concession to its patrons than any other in the State. In any event the result of the experiment on these three roads cannot but be watched with great interest and can hardly fail to be instructive.

WORCESTER & NASHUA RAILROAD CO.

Our present local freight tariff was revised January 16, 1868, a copy of which I enclose for reference. All or nearly all our coarse heavy freights come from the north and west, on which we get only a *pro rata* division between the point of shipment and our terminus. Some of this business, however, we take at contract rates paid us by connecting roads who hold such contracts with us. We get very short hauls on nearly all our local business, receiving a large portion of it at the junctions of the Fitchburg, Stony Brook, Peterboro' & Shirley and B, C. & F. roads at Sterling and Clinton. Our tariff shows our rate on coal to be \$1.60 per net ton between Worcester and Nashua, but the *largest* price we get for *any distance* is \$1.25 per gross ton, and from that down to much less than \$1 per ton for shorter distances. Our local business (freight), is considerably less than one-third as much as the through business to and from other roads.

C. S. TURNER, *Superintendent.*

WORCESTER, Oct. 28, 1871.

WORCESTER & NASHUA RAILROAD.
SUPERINTENDENT'S OFFICE, WORCESTER, Jan. 5, 1872. }

WM. A. CRAFTS, Esq., *Clerk Railroad Commissioners, Boston.*

DEAR SIR:—In answer to your favor of the 26th ultimo, will say. We made a reduction of our passenger fares of about 15 per cent. on the 1st of January, 1871.

Between some points the reduction will show a larger per cent. and between others not quite as much, but I think the average is even more than 15 per cent. Our passenger earnings show a falling off of about \$10,000 during the twelve months of 1871 as compared with same time in 1870. Yours truly,

C. S. TURNER, *Superintendent.*

RATES FOR TRANSPORTATION ON THE WORCESTER & NASHUA RAILROAD.

Passengers.

	Highest.	Lowest.
Rate per mile from station at Worcester,—	Cents.	Cents.
For the shortest distance passengers were carried, in 1869,	10	3
“ “ “ “ “ “ in 1871,	10	3
For distances more than 5 and less than 15 miles, in 1869,	5	$\frac{87}{100}$
“ “ “ “ “ “ in 1871,	4	$\frac{79}{100}$
For distances more than 15 and less than 30 miles, in 1869,	5	$\frac{69}{100}$
“ “ “ “ “ “ in 1871,	4	$\frac{61}{100}$
For distances more than 30 and less than 50 miles, in 1869,	4½	$\frac{69}{100}$
“ “ “ “ “ “ in 1871,	4	$\frac{63}{100}$
For distances more than 50 and less than 100 miles, in 1869,	*	* $\frac{63}{100}$
“ “ “ “ “ “ in 1871,	*	*
Rate per mile the whole length of main line in Massachusetts, in 1869, about	4	$\frac{6}{100}$
Rate per mile the whole length of main line in Massachusetts, in 1871,	3	$\frac{51}{100}$
Rate per mile for <i>through</i> passengers passing over the line to or from points on other roads within or beyond the State, in 1869,	2½	†
Rate per mile for <i>through</i> passengers passing over the line to or from points on other roads within or beyond the State, in 1871,		

Freight.

	First Class.	Second Class.	Third Class.	Fourth Class.	Coal.
Highest rate per ton per mile from Worcester,	Cents. 20	Cents. 17½	Cents. 15	Cents. 12½	Cents. —
For shortest distance freight was carried, in 1869,	70	60	50	40	—
For shortest distance freight was carried, in 1871,	70	60	50	40	—
For distances more than 5 and less than 15 miles, in 1869,	13½	12	9½	8	—
For distances more than 5 and less than 15 miles, in 1871,	13½	12	9½	8	—
For distances more than 15 and less than 30 miles, in 1869,	10	8½	7½	5½	—
For distances more than 15 and less than 30 miles, in 1871,	10	8½	7½	5½	—
For distances more than 30 and less than 50 miles, in 1869,	7½	6½	4½	3½	—
For distances more than 30 and less than 50 miles, in 1871,	7½	6½	4½	3½	—

* No travel as long distance.

† No commuted rate.

Freight—Continued.

	First Class.	Second Class.	Third Class.	Fourth Class.	Coal.
For distances more than 50 and less than 100 miles, in 1869, . . .	Cents. —	Cents. —	Cents. —	Cents. —	Cents. —
For distances more than 50 and less than 100 miles, in 1871, : . . .	—	—	—	—	—
For the whole length of main line in Massachusetts, in 1868,	7 $\frac{3}{4}$	6 $\frac{1}{10}$	4 $\frac{3}{4}$	3 $\frac{1}{2}$	—
For the whole length of main line in Massachusetts, in 1871,	7 $\frac{3}{4}$	6 $\frac{1}{10}$	4 $\frac{3}{4}$	3 $\frac{1}{2}$	—

The above replies include all the principal railroad corporations of the State, excepting only the Boston, Hartford & Erie, the Norwich & Worcester, the New London Northern and the Housatonic. From these companies no answers to the circular have been received. Taken as a whole the Commissioners do not see how these replies can be considered otherwise than satisfactory, and as indicating a decidedly progressive condition of affairs in the railroad system of the State.

RETURNS FOR 1871.

It is with peculiar gratification that the Commissioners submit to the legislature the returns of the several railroad corporations of the State for the year ending September 30th, 1871. The old form of returns in use when this Board was established was strictly prescribed by law. The Commissioners were not empowered to make any changes in it until the passage of chapter 307 of the Acts of 1870, which took effect in July of that year. The Commissioners were authorized under § 3 of this Act "to make such changes and additions in the form of said returns and reports as they shall deem expedient, and they shall give to the several railroad corporations one year's notice of any such changes as require any alteration in the method or form of keeping their accounts." Under the authority thus conferred a new form of return was immediately prepared and the corporations notified that it would take effect on the 1st of October following. The year prescribed in the Act elapsed on the 30th of September last, and the returns now submitted are made under the new form. It is almost unnecessary to say

that, although this form of return was prepared with great care and knowledge by Mr. Edward Appleton, then one of the Commissioners, and though a great advance on the old form, yet the practical experience of the year has developed a number of points in it which admit of improvement and which will tend considerably to increase the value of the returns in future. As none of these changes will call for any alteration in the method of keeping the books of the corporations, they can be made so as to take effect during the present year.

The Commissioners hope that the present volume will be found to be a valuable addition to railroad statistics. The old returns, never very accurate, had gradually, through the want of any responsible supervision, become almost as much calculated to deceive as to enlighten. Reference has already been made to the fact that it is wholly impossible to ascertain from them even the correct railroad mileage of the State for any given year. Another instance of their deceptive character is afforded in the case of passenger fares. A table (No. 5, p. 45) in the last annual report of this Board shows the average fares of passengers per mile during ten years on certain roads in the State. The table is correct according to the returns, but wholly deceptive in its results. Almost all of these roads have large numbers of season-ticket passengers. On most of them, season tickets were arbitrarily computed at a certain number of trips per week during the earlier years named in the table, and this number was greatly increased during the latter years. A season ticket computed for example at twenty-four trips per month in 1861 is now computed at fifty-two trips. An addition, in certain cases, of several millions was thus made to the total number of persons carried one mile and the average rates of fare were proportionately decreased. No indication of this charge anywhere appears in the returns. Take again the earnings per mile of road as reported for any given year in the official tabulated statement,—that for the year 1866, for instance. It appears that there were then 1,461 miles of railroad in the State, earning a gross increase of \$21,205,527, or an average of \$14,500 per mile. This is very clear. Take now the Hartford & New Haven road;—it returns 5.87 miles of road and \$1,591,804 of gross income,—or the income of its entire 62 miles of road on

the small fraction of it in Massachusetts, being at the rate of \$271,178 per mile;—and at this rate it is entered in the grand total. These inaccuracies have often led even the trained and experienced officials of the roads into singularly erroneous statements; and on one occasion at least, at a hearing before this Board, the counsel of a corporation, one party to the question at issue, wholly declined to be bound by the returns of his company, just published, on the ground that they were manifestly and notoriously inaccurate. No persons probably have had greater occasion to consult these returns during the last few years than the members of this Board, and they have been led to conclude that results to be derived from a study of them can rarely be depended upon, except when reached after a most careful analysis of details, and even then they can be accepted only as approximately correct.

The Commissioners have spared no pains to make the present returns as accurate and reliable as possible. A very cursory examination of them will show that great room still exists for improvement in this direction, and yet they venture to hope that a very considerable progress will be found to have been made. The inaccuracies in the published volumes of returns are of two descriptions: those inherent in the returns of the corporations themselves, and for which they are responsible, and those arising from the manner in which returns, based on different modes of keeping accounts, are put together and presented to the public. The Commissioners have caused two classes of tabulated statements to be prepared, calculated, the one to present all possible information in regard to the railroad corporations in a reliable form as reported; and the other, by comparison, to detect any errors or gross discrepancies in the returns themselves. These tables have been prepared for the Board, under its general direction only, by Mr. Charles Soule, of Boston. Their preparation involved much labor and familiarity with accounts, and it was manifestly impossible for the Commissioners themselves to follow the work through its details. They simply therefore specified the tables to be made up, and to Mr. Soule belongs all the credit or otherwise of their accuracy in detail.

The comparative tables constitute, in so far as the Commissioners are advised, a new experiment in published railroad

statistics. Through a series of tables all the roads of the State, both as regards construction and operation, are brought into sharp contrast with each other. This process has been carried through every detail which suggested itself to the Commissioners, and the result is most curious and valuable. Many discrepancies and divergencies are brought to light which the corporations will themselves be anxious to remedy in future. Meanwhile the test is the most severe to which a body of returns can be subjected, and from it the Commissioners anticipate most useful results.

COST OF OPERATING RAILROADS.

In an earlier portion of this Report the Commissioners stated that they were utterly unable to ascertain, after a careful study of the returns, what was the cost of *operating* any given road in the State for a single year. By reference to Comparative Table C, No. 24, at the close of this Report, it will be seen that the average cost of operating a mile of railroad in Massachusetts is returned for the last year at \$6,944.89; varying under ordinary circumstances from \$2,500 on the South Reading branch, to over \$21,600 on the Boston & Albany. This discrepancy is natural and easily explained. The cost per train mile,—or the cost of running each train one mile,—averages \$1.39; varying under ordinary circumstances from 83 cents on the Boston, Hartford & Erie, to \$1.77 on the Connecticut River road. This is the alleged cost to be deduced from the returns. As a basis of comparison, take the Old Colony & Newport road, which returns \$1.08 as its cost per train mile. This is a thoroughly solvent, well-managed company, running great numbers of trains, and keeping its rolling stock and permanent way in a condition which will compare favorably with those of any other road in the State. That in 1871 the property did not deteriorate is made clear by the following extract from the company report:—

“Two new locomotives, six passenger-cars, two baggage-cars, forty-eight freight-cars, and nineteen coal-cars have been added to the rolling-stock.

"Five locomotives, two passenger-cars, twenty freight-cars, and fifteen gravel-cars have been rebuilt.

"About 800 tons of new iron, and 500 tons of steel rails, and 39,000 new sleepers have been used in repairing the track, and 2,000 tons of rails have been taken up, repaired, and relaid.

"Land has been filled up at South Boston to increase our yard-room. A paint-shop in Boston, and a new engine-house and turntable have been built at Fall River, at an expense in all of about \$18,000.

"All the above additions, renewals, and repairs have been charged to expense account, and paid for out of our earnings the past year.

"The road, equipment, and property is in good and efficient condition."—*Report*, p. 7.

Yet during that same year the Boston & Providence returned its cost per train mile as \$1.67, or 55 per cent. more than the Old Colony; the Fitchburg at \$1.51, or 40 per cent. more; and the Boston & Albany and the Boston & Lowell at \$1.42, or 31 per cent. more. If, in reply to the assertion, which has frequently been made, that these latter figures really represented the expenditures incurred in operating the roads named, the Commissioners were to assert that the managers of these roads must then operate them in an extravagant and wasteful manner, those gentlemen would most justly feel extremely indignant, and might well charge the Commissioners with gross lack of familiarity with the subject. No such inference can be drawn. No roads in the country are probably operated more economically or with greater attention to detail than the several roads named. The inevitable inference is that a very large proportion of the money charged under the head of expenditures in operating roads, was not expended for that purpose at all, but went towards providing those new and increased facilities imperatively required to accommodate the growing business of the companies.

For the reasons here given the Commissioners ventured the opinion they have expressed. The legitimate cost per train mile on the principal roads of this Commonwealth does not under ordinary circumstances, so far as the Commissioners can judge, exceed \$1.00. This, however, allows simply and strictly for operating expenses and proper renewals, and includes no additions whatever to construction or rolling stock. These

must be provided for from other sources, of which there are but two: the one, surplus earnings; the other, increased capital. Neither is the average cost of \$1.00 per train mile absolute;—it necessarily varies according to circumstances and the nature of the traffic, whether freight or passenger, of particular roads. A company called upon to handle great amounts of merchandise is at a disadvantage when compared with one engaged principally in the passenger business, and this disadvantage is increased when the length of such road is very limited. No reasonable allowance on these accounts, however, will explain the discrepancies in the table referred to; they can, indeed, hardly be attributed to anything but the presence of large annual surplus earnings on the operations of certain companies which are devoted to construction.

It is undeniable that this policy on the part of the corporations has always been favored by public opinion in Massachusetts. The demand has been that the railroad corporations should close their construction accounts, and that necessary expenditures on account of all ordinary development or increased equipment should be met out of surplus earnings and charged to operating expenses. In this way vast properties have been gradually accumulated by the more successful companies, out of all proportion to the construction accounts standing against them. The jealousy felt of late years as regards all further increase of capital stock, even when the par value is paid in upon it, tends strongly to aggravate this condition of affairs. But the fact meanwhile is, that, instead of paying interest in the form of dividends, on private capital invested in railroad development, the community is itself, through the medium of surplus earnings devoted to construction, paying in the required capital; this additional capital, it must be remembered, receives no dividends, nor is any interest paid on it; the community simply pays the cost of development outright and at once, instead of saving the direct outlay and paying interest on the cost in perpetuity.

The opposite course would be to systematize railroad accounts, definitely separating all operating expenses from charges for construction, and then to encourage the corporations to meet all charges on account of construction through increase of capital, under suitable restrictions, while all surplus earnings, after

the payment of legitimate operating expenses and regular dividends, should be remitted to the community through a reduction in rates. This policy would call out accumulated capital to do the work of railroad development, just as it had been originally called out to do the work of primary construction; while it would, through the reduction of rates, leave active capital in the pockets of the people, to be used in business development.

The Commissioners do not refer to this somewhat intricate subject for the purpose of suggesting any change in the policy hitherto pursued. That policy on the part of the railroad corporations has always been endorsed by the public sentiment of Massachusetts as sound and conservative, and it is perhaps well that it should be continued. It ought, however, none the less to be understood, which at present it is not. Every proposal for a reduction of rates will always be met with an answer (whether sound or not on other grounds is here immaterial) that the corporations, under their present tariffs, earn only enough to pay operating expenses and moderate dividends. Yet it is difficult to see how they can ever earn more than enough for those purposes so long as "operating expenses" are made to include the cost of an indefinite development. The alternative is perfectly clear. The development of the system must go on and the community must pay for it;—this it can do in one of two ways, and in one of two ways only;—it can pay interest on the necessary private capital invested in the work of development, or it can pay the cost of that development itself through the medium of surplus earnings. It is the last which it is now in great degree doing. Whether any good results would follow an attempt to pursue the other course the Commissioners do not at this time care to discuss. Their present object is simply to throw such light as they can on the question of what is apparently meant by the term "*cost of operating*" railroads.

PART II.

ACCIDENTS DURING THE YEAR.

The usual tabulated statement of accidents reported as occurring on the several railroads of the State during the year ending 30th September, 1871, will be found in Appendix D of this report. It will be seen that 280 casualties in all have been reported to the Board, of which 157 resulted in loss of life. Of the whole number killed and injured, 141 were passengers, 53 were employés, and 86 were persons of all other descriptions. Of the casualties resulting in death, 44 were passengers, 40 were employés, and 73 were of persons of all other descriptions.

This unusual number of casualties, and especially of those to passengers, was due to the occurrence of two train accidents of a peculiarly disastrous nature.

THE READVILLE ACCIDENT.

As the 5 minutes of 10 A. M. train from Southbridge on the Boston, Hartford & Erie road was approaching the Readville station a serious accident from derailment occurred, resulting in the death of one passenger and the more or less serious injury of 25 others. The inward track of the road at the point in question approached the Readville station around a curve and upon a descending grade. As a consequence of this, and of the fact that the road is double tracked, there is a continual and decided tendency towards a creeping of the iron in the direction of travel. This tendency had been probably augmented by the fact that for a short distance at this point the road was laid with the compound, continuous rail.

Every spring this piece of track had been a source of anxiety to the road-master, calling for incessant attention and continued cutting of the rails. The winter of 1870-1 had been marked by weather of peculiar severity,—the mercury falling as low as 10° below zero, and the consequent contraction of railroad iron had been very great. As the weather grew warmer and the iron expanded the section-master in charge had cut the rails twice, taking out about six inches each time,

the last of these cuttings, as he asserts, having been made on the day immediately preceding the accident. The 7th and 8th of April, however, were days of unusually high temperature, the mercury on the first of these days standing at 73° in the shade, and on the second, the day of the accident, at 87° , and at 110° where exposed to the sun. The tendency of the iron to expand was therefore almost unprecedented, and at this point it resulted not only in the closing up of the six-inch cutting of the day previous, but the whole track, ties and all, was suddenly lifted up at least a foot above the level of the road-bed. The Southbridge train consisted of a locomotive, a baggage, a smoking and a milk car and four passenger cars. The forward part of the train passed safely over the point of danger, but all the passenger cars were thrown from the track, and the two last, containing some seventy passengers, rolled down the embankment of some thirty feet into a shallow pond at the foot of it. Both cars rolled completely over, the first finally resting on its side, the other coming to its natural position;—both of them were greatly damaged, losing their monitor roofs and trucks. Singularly enough the passengers, though greatly frightened and bruised, were none of them killed;—one of them, a female, sustained internal injuries, from the effects of which she subsequently died;—of the others, 25 were in a greater or less degree strained and bruised, but no limbs were broken, nor are any permanent injuries known to have been inflicted.

This accident belongs to that not inconsiderable class against which it is impossible to provide, except through the constant vigilance of trained employés. The sudden and violent expansion of the tracks on this occasion was felt on almost every railroad in the country, and led to two other cases of derailment at least in New England. That it resulted in no more serious catastrophe speaks well for the vigilance and caution of the several corporations. In this case the Commissioners, after examining the locality, as a matter of precaution recommended the replacing of the continuous compound rail by the ordinary T rail, as this last seemed to them to admit of more effective precautions both against creeping and springing from expansion. This recommendation was complied with by the corporation.

THE COLLISION AT REVERE.

On the evening of the 26th of August as the Beverly accommodation train on the Eastern railroad was on the point of leaving the Revere station, at about fifteen minutes after 8 o'clock, it was violently run into by the Portland express train, which was following it upon the same track. The collision was the result of a combination of fortuitous circumstances deeply implicating the management of the road.

The travel over the Eastern railroad is of a somewhat exceptional nature, varying in a more than ordinary degree with the different seasons of the year. In the winter months the corporation is called upon to provide for a heavy, but tolerably fixed passenger movement of some 75,000 a week, while in the summer what is known as the excursion and pleasure travel will not infrequently increase this number to 110,000, and even more. As a consequence, it has for years been no unusual thing for the company to find itself overtaxed for accommodation, for days together, beyond its utmost resources. This was especially the case in the week ending August 26th, during which there had been a camp-meeting at Hamilton, a brigade muster at Swampscott, and an additional camp-meeting at Kennebunk, on the Portland, Saco & Portsmouth road, for the accommodation of which the Eastern road had been called upon to furnish its proportion of rolling stock. The number of passengers seeking transit over the road had accordingly risen to over 142,000 ; while the regular number of 152 freight and passenger trains was increased to 191. The officers of the road, as subsequently appeared, had never been in the custom of placing any very great degree of reliance upon the telegraph in moving their trains, and it did not appear that any use had been made of it in this emergency. Even the branches and those portions of the main road which were supplied only with a single track, constituting 93 miles of the entire 115 miles operated by the company, depended for their train movement entirely on a schedule arrangement. Great confusion in the operation of the road almost necessarily resulted from this condition of affairs, and, during the day of the accident, trains arrived at and left the station in Boston in very considerable disregard of their regular time. This was particularly the

case towards evening, when the employés of the road seem to have directed all their efforts to despatching trains as fast as cars could be procured, thus trying to keep the station as clear as possible of the throng of impatient travellers which continually blocked it up. According to the regular schedule four trains should have left the Boston station in succession between 6.30 and 8 o'clock, P. M.: a Saugus branch train for Lynn at 6.30, a second Saugus branch train at 7, the Beverly accommodation train at 7.15, and, finally, the Portland express at 8 o'clock. All of these trains left the Boston station out of time and in the following order:—the 6.30 Saugus branch at about 7 o'clock, the Beverly accommodation at 7.40, the 7 o'clock Saugus branch, both out of time and out of place in order of trains, it being behind the Beverly train instead of before it, at 7.53, and, finally, the Portland express at not more than 5 minutes after 8. All of these trains went out over the same track, which the Saugus trains were to leave at the junction in Everett, where the branch road departs from the main track. Beyond that point the Beverly and the Portland trains alone ran over the main line of the road, having a regular and ample schedule time of 45 minutes between them, which, however, was on this occasion reduced through the delay in starting the Beverly train to from 15 to 20 minutes. No other causes of additional delay therefore arising, the simple case was presented of a slow accommodation train being sent out to run 18 miles in front of a fast express train, with an interval, under all ordinary circumstances amply sufficient, of 20 minutes between them.

The Beverly train was, however, subjected to a still further delay at the junction of the Saugus Branch with the main line at Everett. This branch was a single track road, and the rules of the company were explicit that no outward train was to pass on to the branch until any inward train there due should have arrived and passed off of it. No siding had ever been provided at the junction, upon which a branch train could temporarily be placed so as to keep clear the main track while it awaited the arrival of an inward train, neither did the special rule regulating the operation of the road at this point make any provision for clearing the main track by temporarily moving any outward branch train on to either the inward or the branch track, under protection of a flag, while trains behind it passed on; and then

moving it back in the same way, after the main outward track was clear. This the employé in charge of the signals and switches at the junction, subsequently testified that he was in custom of doing, on his own responsibility, whenever a block took place, which it appeared not infrequently happened. Obviating the difficulty in this way, he had never reported its occurrence to the superintendent of the road, who was consequently ignorant of the fact that any practical necessity for a siding existed. The severe illness and consequent absence from his post of the employé in question on the 26th of August was, therefore, one material link in the chain of fortuitous events which resulted in the accident. In the absence of the regular switchman, the substitute in charge simply followed the letter of the rule and took no steps towards relieving the block of the main train.

The leading Saugus train accordingly remained on the outward main track, blocking the progress of the Beverly train, which came up behind it at about ten minutes before 8 o'clock, and awaiting the arrival of a branch train which, according to the schedule, should have left Lynn at 6 o'clock, or nearly two hours before. The prevailing confusion and insufficiency of rolling stock, combined with the accidental breaking of a car-coupling, had, however, delayed the departure of this train among others, and it did not leave the Lynn station until 7.30 P. M., or one hour and a half after its schedule time. This train consequently did not reach the junction until some ten minutes after 8 o'clock, thus relieving the block which had then existed for nearly an hour and a half. There were then standing at the junction the 6.30 Saugus train, a special locomotive on its way to Salem, the 7.15 Beverly accommodation, and the 7 o'clock Saugus branch, in all three trains and one wild locomotive. In addition to these the Portland express had now left Boston, and when the block at the junction was relieved it had already arrived there and was stopped by the signal men in charge of the rear of the last Saugus train. The engineer of the express train waited until signalled that the main track was clear, when he again got under way, seeing as he passed the junction the tail-lights of the train which had been before him and had stopped him disappear on the Saugus branch.

The Beverly train meanwhile had been delayed by this block from twelve to fifteen minutes, thus reducing the original interval of time between it and the Portland express from twenty minutes to not more than five, even allowing for the slight delay of the express train in starting;—the Beverly accommodation was, in fact, now running on the schedule time of the Portland express. Had its conductor been aware of this fact, he would simply have directed the station master at Everett to warn the engineer of the Portland train. Unfortunately, however, he was ignorant of it, as it had devolved upon the branch train behind him in the block to stop the Portland train, and knowing that he was entirely out of his regular time and also supposing that the branch train behind him was the Portland train, he seems never to have doubted that this train had been cautioned before starting to look out for him, and also knew where he was. He accordingly neglected to take any precautions, and seemed to be less correctly informed as to the true condition of affairs than some of the passengers on his train who had already begun to evince alarm. He resumed his way without even looking at his watch, and with a general impression that he had not been delayed at the junction more than six or eight minutes, when in fact he had been delayed there fifteen. The Portland express was thus immediately behind him.

Before this train left Boston, the superintendent of the road had instructed the depot master to caution the engineer to look out for the trains ahead of him, as, owing to the non-arrival of the Lynn 6 o'clock train it was known that there must be a block at the Saugus branch junction. This order was a mere verbal one and does not seem to have been correctly transmitted, or, if it was, it was not fully apprehended by the engineer. It was delivered to him after he had started his train, the depot master walking along by the side of the locomotive, and was understood to apply to the branch train which had immediately preceded him out of its schedule order. When he saw at the junction the tail-lights of this train disappearing on the branch track, he accordingly concluded that the main line was clear before him, and dismissed the caution from his mind.

The close proximity to each other of the two trains after they left the junction, attracted the notice of certain of the employés of the company at different points, but no system of caution

signals seems to have been provided, and the great irregularity in the train movement of the road seems also to have demoralized the employés to some extent, so that they apparently took it for granted that those in charge of the trains were fully aware of their relative position. As the two trains approached the Revere station they were so close upon each other as to be on the same piece of straight track at the same time, and the head-light on the locomotive of the Portland express was distinctly seen by a passenger standing at the rear end of the Beverly train. The night, however, was not a clear one. An east wind had prevailed during the day, and a mist was driving in from the sea and lying in clouds over the marshes,—the vapor at times lifting, so that objects at a distance were perfectly visible, while at other times they were much obscured. Although, therefore, the powerful reflecting head-light of the locomotive was seen from the Beverly train, it did not follow that the comparatively dim tail-lights of the Beverly train could be seen by the engineer of the train following it;—it was, on the contrary, the judgment of the passenger who saw the head-light that they could not have been seen. The interval between the two trains was probably less than a mile when the Beverly accommodation reached Revere.

The station house at Revere is placed at the end of a tangent of some length, and the curve on the outward track begins immediately in front of it. The tail-lights of an outward train standing before that station would, in ordinary weather, be visible a very considerable distance in the direction of Boston, and even on the night of the 26th of August they were probably visible a sufficient distance to enable any train approaching at a reasonable rate of speed to be stopped. Unfortunately they were not seen so soon as they might have been by the engineer of the Portland express. This appears to have been due to the fact that Revere station is the point at which the East Boston freight tracks diverge from the main line of the Eastern road. The engineers of all trains approaching Revere are notified by means of signals raised to the head of a flagstaff, which stands near the station, whether the switches are regulated for the use of the main track or the freight track. When no light is at the masthead the main line is open; a red light at the masthead indicates that the main line is closed and that the freight

track is open. The signal was also used whenever any train was to be stopped at Revere. It was, therefore, the first duty of any engineer approaching the Revere station to assure himself beyond any doubt that there was no light at the masthead, and that consequently the track was clear. This regular duty it must be presumed, and there is reason to believe, the engineer of the Portland train was attending to as he neared the Revere station, running at a speed of from 20 to 25 miles an hour. The partial obscurity of the atmosphere probably made it more difficult than usual for him to assure himself about this signal;—at any rate, when he next looked down the track before him he was so near the Beverly train that a collision was inevitable,—in his own words at the subsequent inquest, “the tail-lights of the accommodation train seemed to spring right up in his face.” Those in charge of the two trains apparently became aware of their proximity at about the same moment and at a distance from each other of some 800 feet. The Beverly train had just started, but had not got any headway on, and its conductor at once sprang on to the track behind it, waving his lantern as a signal of danger. The engineer of the Portland train had, however, already signalled danger and reversed his engine, while the brakes were being rapidly set. The rails, however, were in a peculiarly damp and slippery condition, so that the wheels failed to catch perfectly, nor did the interval of time which elapsed between the whistle for brakes and the collision suffice to enable the brakemen completely to set a single brake. In fact, as immediately after reversing his engine the engineer jumped from the train and his fireman did the same, without waiting to apply the locomotive brake,—as the train baggage master hardly had time to get to his brake before the collision took place and he was caught between the cars,—it would appear that not more than two brakes on the entire train contributed materially to the reduction of its speed. The 800 feet of interval, therefore, only sufficed to bring down the speed of the colliding train to the neighborhood of ten miles an hour at the instant of collision.

The first intimation of immediate danger which the passengers in the rear Beverly car seem to have had was the sudden lighting up of their car by the glare of the head-light of the approaching locomotive. Immediately afterwards the collision

took place, the locomotive striking the rear of the car with such force as to bury itself two-thirds of its length in it. The smoke-stack of the locomotive was swept away, its truck was in some unaccountable manner forced backward until it rested between the driving wheels and the tender, the entire boiler rested inside and upon the rear truck of the car, while the valves were so broken as to admit of the free escape of the scalding steam.

In the car there were at the time of the accident between 65 and 70 human beings, seated and standing. When the collision was known to be imminent, a rush of the passengers to the forward part of the car took place, and the colliding locomotive in ploughing into it crushed furniture, fixtures and human beings in a mass into the further end of the car. At the same time the kerosene lamps with which the forward cars of the train had been lighted were thrown down by the blow and broken, and the fluid igniting at once set the comparatively uninjured part of the train in flames. The rear car was probably kindled from the same cause, combined, however, in this case with coals from the locomotive fire-box.

The Revere disaster involved a greater loss of life and severe personal injury than any railroad accident, with one exception, which ever occurred in New England. On the 6th of May, 1853, a portion of a passenger train on the New York & New Haven railroad was plunged into the river through the open draw of the bridge at Norwalk, Conn. An engine and tender, two baggage cars and two passenger cars went completely over, while a third passenger car broke in the middle, a portion falling into the river and the rest remaining on the bridge. About one hundred persons were carried over in the cars, of whom forty-five were immediately killed or subsequently died from injuries received, and some thirty were badly injured.* The Revere collision resulted in the death of 29 persons; 57 others were more or less severely injured. No one not in the rear car of the Beverly train was killed. The engineer and fireman

* It is an interesting fact, in connection with the statistics of railroad accidents, to state that, "in the fifteen years ending March 31st, 1871, 23,587,001 passengers were transported over the New York & New Haven railroad, without any accident to any train while on that road that caused the loss of a single life or limb to any passenger so transported."

of the Portland express jumped off before the collision occurred and escaped with a few trifling scratches ;—the baggage-master of the same train was caught between the cars while at his brake, and seriously injured.

The Commissioners do not understand that it in any way belongs to them to apportion responsibility among those immediately implicated in the occurrence of the Revere or any other railroad accident. That duty the law devolves upon other public officials. The understanding of the Commissioners as to their province in this and all similar cases was expressed in their Second Annual Report (pp. 25-6) : “ The object of the legislature in directing all accidents to be reported to this Board, and an examination into them to be made by it, was undoubtedly twofold : 1st, to provide for the enforcement of any penalty prescribed in case the accidents arose from the failure of a corporation to obey the laws of the Commonwealth ; and 2d, in all cases where it should appear that the existing laws were insufficient to provide for the security of the travelling public, to make provisions for supplying such deficiency.” The Commissioners have seen no reason to suppose that the Revere disaster was occasioned, or in any way aggravated by the failure of the Eastern railroad to obey any law of the Commonwealth. It only remained therefore to suggest the adoption of such precautions as would be likely to prevent the recurrence of any such disaster in future.

From the statement already made it will be seen that the collision at Revere resulted from a combination of causes and defects of management, all of a preventible nature, but some of them peculiar to the Eastern railroad, while others were common to it with almost all other members of the railroad system. Apart from any immediate carelessness or neglect of duty among subordinate employés, the accident seemed directly attributable to the following causes, relating to the management or equipment of the Eastern road :—

1st. To a laxity of discipline, running throughout the organization, which had apparently resulted in a very considerable confusion not only in the movement of trains but in the carrying out of the rules for operating the road generally, and which was especially noticeable in the confusion prevailing in and around the station in Boston.

2d. To a deficiency in rolling stock adequate to meet the demands of the average summer business.

3d. To the want of a siding at the Saugus branch junction.

4th. To the want of telegraphic communication with the stations on the Saugus branch road, which would have enabled the company to move its trains over that road without the necessity of unlimited delays at fixed points of passing, the happening of one of which caused the delay which resulted in the collision.

5th. To the attempt at doing an excessive amount of excursion and extra business, thus imperilling the safety of the regular travel.

The Commissioners, however, were very desirous that any action or recommendation of theirs in consequence of this accident should be based on the calmest and most thorough investigation in their power both into its causes and their means of prevention, and should have the widest application possible. Such an investigation required time. As regarded the immediate safety of those travelling over the Eastern railroad, the Commissioners felt no uneasiness. Travelling by rail is never so free from danger as while the impression left by some grave calamity is fresh in the minds both of the public and the employés, and greater care and oversight have probably been exercised on the railroads of Massachusetts during the last four months than ever before in their history. The prompt action of certain committees of citizens appointed at public meetings held immediately upon the accident, removed any doubt upon this point and gave the Commissioners ample time for their own more thorough and extended inquiries. The excited condition of the public mind immediately subsequent to the accident required some assurance that action was being taken which would render impossible its recurrence. During the earliest stages of the investigation, therefore, this Board was invited by members of the citizens' committee to advise them as to what additional safeguards to travel on the Eastern railroad seemed to be of immediate necessity. The Commissioners in reply submitted in writing such changes and precautions as their examinations had so far suggested. These were subsequently incorporated with others into a body of requests which were submitted by the

committee to the president of the Eastern road, who at once complied with them upon all material points.

There was, however, one cause of this accident, and a very prominent one, peculiar to the Eastern railroad, to which the Commissioners wish particularly to call the attention of the legislature, but which could not be made the subject of any recommendation addressed to the corporation itself. It was very apparent that the overcrowded condition of the Eastern railroad during the week ending the 26th of August was the immediate cause of the disaster. The company was trying to do more than it had the means of doing. This arose fully as much from the active competition it was then carrying on with the Boston & Maine road on its through business, as from its exceptional summer travel. The demands coming from the other end of its line for new connections and increased competition kept it continually short of rolling stock. The continuance of this competition seems to the Commissioners a matter of very questionable advantage both to the community and to the corporations engaged in it. It has had no tendency towards the reduction of fares and freights for several years past, and it necessitates the support by the community of two rival organizations requiring a double machinery of officials, terminal facilities, freight and passenger trains etc., to do what one consolidated company could do much more conveniently and economically. The consolidation of these two roads was much discussed a few years ago and seemed not unlikely to take place; it was, however, prevented by circumstances which it is now unnecessary to discuss. Since that time the divergence between them has been growing wider, and the two corporations, with a remarkable disregard of their own interests only to be accounted for by the spirit of enmity existing between them, have embarked deeper and deeper into costly competing enterprises, until at last two completely equipped roads have been developed at an immense outlay of capital to do one moderate through business. So far as the Commissioners can judge, the consolidation of these two companies, even at this late day, would be a matter of almost unmixed advantage. It could not indeed save the millions which have already been expended in needless railroad construction; but it would save yet other millions, the expenditure of which, though equally needless, is

yet surely involved in the further continuance of the struggle. Upon all of this capital, both that which has been and that which hereafter may be expended, the community has got to pay interest forever. A heavy outlay, to be estimated only in millions, seems now to be impending over one of these corporations, to secure a convenient approach to and terminal facilities in Boston. The other stands in urgent need of extensive freighting grounds and deep-water facilities also in Boston. A consolidation would not only obviate the necessity of much outlay on those two accounts, but it would go far towards solving the very difficult problem of terminal stations on the north side of the city. By combining the properties and tracks of two of the four roads entering there it would get rid of one vexatious and dangerous grade crossing; it would enable the two roads to greatly reduce their number of officials, to combine their machine shops, both reduce and simplify their train movement, and, by combining rolling stock, to use it much more effectively. Finally, it would extend one equable and responsible management over all the north-eastern portion of the State, which has for years been a species of battle-ground for these contending companies. The conflict has resulted also, not only in a combination as to fares and freight, but in sharp struggles for the control by one company or the other of all local roads, not with a view to their development for the purposes for which they were chartered, but to turn their business from the direction of the rival road. In this way public interests have not infrequently been subordinated to corporate interests, until the over-eagerness of competition greatly contributed towards the occurrence of the most deplorable railroad disaster in the history of the State. The Commissioners do not deem it necessary to enter at this time into the details of any measure calculated to bring about such a consolidation as that suggested. They have, however, given some consideration to the subject, and they believe that such a measure might be framed without any excessive difficulty. Should it appear in the course of the present legislative session that any proceedings looking in this direction were likely to meet with favor, they would gladly render any assistance in their power towards perfecting them.

RAILROAD ACCIDENTS: THEIR FREQUENCY, CAUSES AND MEANS OF PREVENTION.

Returning from the consideration of the circumstances connected with the Revere accident which were peculiar to the Eastern railroad, there were also certain other defects of management and causes contributing to that accident which seemed to be not peculiar to the Eastern railroad, but to exist in a greater or less degree upon most, if not upon all of the other roads of the Commonwealth. In saying this the Commissioners do not seek to imply that the Massachusetts roads are carelessly or incompetently operated as compared with other roads, either in this country or abroad. Such an impression would be erroneous in the extreme, as will be made very apparent in the course of this Report. On the contrary, the Commissioners have been forced to conclude that the Massachusetts roads are very carefully operated, though on a system and with appliances which their business has in many respects outgrown, and without the full aid of many improvements which have been successfully adopted elsewhere.

Entertaining this belief, as soon as the earlier investigations into the Revere accident had been brought to a close, the Commissioners issued a circular to all the railroads of the State calling their attention to certain of the more immediate causes of that accident, and to the fact that similar causes, which might not impossibly have led to similar disasters, existed in the manner of operating many other roads. They also invited the officers of the roads to meet them with a view to conference, and to such consequent action as circumstances might seem to suggest.

In response to this call a large number of gentlemen, representing all the principal railroads of the State met at the rooms of the Commission upon the 19th of September, and, after some discussion, at the request of the Commissioners they selected a committee of five from their number, consisting of the Hon. John H. Clifford, President of the Boston & Providence, D. W. Lincoln, Vice-President of the Boston & Albany, D. L. Harris, President of the Connecticut River, J. B. Winslow, Superintendent of the Boston & Lowell, and William Merritt, Superintendent of the Boston & Maine, Railroads, to advise with and assist the

Commissioners in preparing for submission to the several railroad companies, recommendations as to changes in equipment and in the method of operating their roads, best calculated to prevent the future recurrence of railroad accidents of this and all other descriptions. Having taken these preliminary steps the Commissioners began a careful examination, both into the most frequent causes of accident and the best appliances now known to prevent them. This investigation was long and difficult. In the course of it the Commissioners visited other States, consulting with many of the leading railroad men of the country, and personally examining their methods of operating their roads and the appliances in use on them. At the suggestion of members of the committee, they carefully collated the rules for operating their roads in use by all the corporations of the State, and compared them with those of several of the best-managed roads in other parts of the country. They also made a careful examination of all the accidents which had ever been reported as occurring in this Commonwealth,—extending through the reports of twenty-five years,—classified them and compared the result with such similar classifications as they could procure from the records of other countries. This last branch of their investigations enabled the Commissioners to effect a comparison between the safety of travelling upon the railroads of Massachusetts and upon those of other countries. The results of this action on their part, and of their consequent discussions with the committee of officials they have now the honor to submit.

It has been very constantly asserted and generally conceded as an established fact that, as compared with those of Europe, the railroads of America are operated with a peculiar disregard of human life. Not only in the foreign journals are such phrases “as periodical American railroad slaughters” constantly met with, but in the American press every disaster is followed by a series of assertions of which the following is a fair example: “It may safely be affirmed that there are more lives sacrificed in a year in any one of the large States of the Union by railway and steamboat travel than in all the European States combined.” So fixed is this general impression that it was very currently asserted both in the press and at public meetings held imme-

diately after the Revere accident, that a disaster of similar nature could not have occurred on the railroads of Europe.

It seemed very necessary to ascertain at the outset of the investigation whether this generally accepted statement was well founded. If it should prove to be so, it would very clearly involve the necessity of an immediate revision of our laws under which penalties are visited on those guilty of even this comparative recklessness of human injury. It is, however, somewhat difficult to effect the necessary comparison in order to establish the facts of the case. While regular and carefully prepared statistics on the subject have for a series of years been published by several European governments, almost nothing of the kind can be obtained relating to American railroads. Massachusetts has probably the least imperfect body of returns on the subject to be found in this country. Such as they are these stretch over twenty-five years of railroad experience, but they are very far from being complete, nor are they sufficiently precise in their statements of fact. They begin with the volume of returns for 1847, and in presenting a report accompanying that volume, the joint committee on railroads took occasion to say:—"The committee have reason to believe that the return of accidents is very incomplete. They have the best reason for saying, that many accidents have occurred of which no notice is taken by some of the corporations in their returns."

The experience of the Commissioners, as will hereafter appear, affords some ground for concluding that this criticism is applicable to the more recent as well as the earliest returns. The Commissioners have no reason to suppose that the statistics published year by year in such other States of the Union as prepare any returns at all on the subject, are any more reliable than those of Massachusetts;—it is possible that they may be so, but there is no apparent reason why they should be; and, having no means of verifying them, the Commissioners have not been willing to accept them as accurate. Neither could they succeed in obtaining any statistics upon this subject from the companies organized to insure travellers against injury from accidents. Either these associations conducted their business on a very vague calculation of chances, or they were unwilling to impart their information; but they professed themselves wholly unable to give the Commissioners any assistance in their

investigation. The most diligent inquiry seemed finally to indicate that no body of information had ever been collected respecting American railroad accidents, and also that the materials for making it, so as to include the whole country, no longer existed. The investigation was, therefore, necessarily limited to the experience of Massachusetts alone.

The most obvious basis of comparison, and the one almost invariably adopted, is that between the whole number of casualties occurring within any given period of time and the whole number of those transported within that time by rail. In arriving at this basis, it is in the first place necessary to separate travellers from employés, and in the second place necessary to discriminate between accidents happening to travellers from their own carelessness, and those arising from causes over which they could exercise no control.

The limited extent of the railroad system of Massachusetts necessarily makes its returns for any one year, even when carefully verified, an insufficient basis from which to generalize ;—it becomes necessary, therefore, to base anything like a fair comparison on the experience of a series of years. The ten railroad years immediately preceding the time at which the investigation commenced were selected,—the years between 1861–1870. A careful examination of the returns at once raised grave doubts as to their completeness. Only fourteen passengers out of a total of 199,138,491 carried, were reported during those ten years as having been injured by causes beyond their own control, and yet the same returns indicated the occurrence of no less than seventeen train accidents. Such a result as this would be unparalleled so far as the Commissioners are advised in railroad annals. It was in any case necessary to verify the result before basing any comparison upon it. A circular was accordingly prepared and forwarded to the officers of the several companies, calling for a statement of the whole number of cases in the ten years specified in which any sum of money had been paid to passengers, as the result either of proceedings at law or of voluntary compromise, on account of personal injuries received. The answer to this circular disclosed the fact that the corporations had, during the period named, paid an indemnity in no less than one hundred

and thirty-five cases of death or personal injury, instead of fourteen as appeared by the returns. The Commissioners were perfectly aware that the test applied to the Massachusetts roads in this case was a very severe one, and one which, as supplying a basis of comparison between them and the roads of other countries, was hardly just. Damages are not infrequently paid by corporations in order to avoid litigation, both in cases where the injury was in some degree occasioned by the act of the passenger himself, and where it is of such a slight nature as not to deserve to be made the subject of an official return. Among cases of this description reported in answer to the circular, was one where a woman was injured while leaving a train in motion, but she was very poor and the corporation paid her on account of her injuries;—in another case of a very narrow escape from an accident similar to that at Norwalk in 1853, a great number of passengers were wet and very badly frightened, though sustaining no personal injury properly so called, but the corporation paid them rather than stand suit;—in yet other cases the injury sustained seems to have been indemnified by payments as small as five dollars. If arrived at through a similar process, the accidents returned as happening to passengers from causes beyond their own control on European roads would be greatly increased. For instance, in one country (Belgium) in 1867, the whole number of such accidents on the state railroad was returned at three, out of a total of fifty-four accidents to strangers from all causes, but in this the official report stated that the administration, though it would have been justified in denying all responsibility in the great majority of cases, had yet in most cases made payments of money, to which the public treasury was not legally bound. The Commissioners wished, however, to make the comparison as severe as possible to the Massachusetts roads, so that no question could possibly be raised as to the accuracy of their conclusions in this respect. They accordingly accepted the basis of comparison supplied by the answers to their circular, rejecting only the particular cases in which it was obvious that the injury was of a trivial nature, or was occasioned by circumstances over which the party injured had some control. The subjoined table shows the number of accidents happening in the ten years, 1861 to

1870, inclusive, on the several roads, the whole number of persons transported and the proportion of cases of injury to that number. (Table, No. 2.)

It remains to effect a comparison between the results thus arrived at and those deduced from the returns of foreign roads. In their last annual report the Commissioners referred to the statement of Captain Douglas Galton, made in 1862 in a paper on "Railroad Accidents" read before the Institute of Civil Engineers,* to the effect that "the returns of the 'Messageries Imperiales' (stage-coach company) show, that in a series of years the number of passengers killed and injured, from causes beyond their own control, was 1 in 28,000; whilst from the latest comparative returns of railway accidents, the number of passengers killed and injured from causes beyond their own control would appear to have been on British railways 1 in 334,000; on Belgian railways 1 in 1,600,000; on Prussian railways 1 in 3,000,000; on French railways 1 in 4,000,000."† A more careful examination of the various authorities within their reach has satisfied the Commissioners of the substantial correctness of the averages here given. As compared with the countries specified and averaged over a number of years, it would then appear that the casualties on the railroads in Massachusetts were 1 passenger killed in each 24,904,048 passengers carried; 1 passenger injured in each 1,568,759 carried; and 1,475,795 passengers are carried to each passenger either killed or injured. Or, bringing the figures of the several countries into direct comparison, the returns would indicate that among passengers carried on the railroads of the several countries there are killed and injured on

* Minutes of Proceedings, Vol. 21, p. 363.

† Captain Galton adds: "The greater comparative safety of foreign over British railways can be clearly traced to differences in the conditions of the traffic and management, and in the habits of the people, which lead them to allow the convenience of the railway companies to be consulted in the running of the trains, before that of the travelling public."

It is important to bear this unquestionably correct limitation in mind in discussing accidents on the railroads of this country. The travelling public of America in their demands for speed and comfort compel the railroads to take risks which are never taken on the Continent of Europe. Neither would our people submit for a moment to the restrictions enforced on the German or French roads. It is only with the railroads of Great Britain that any fair comparison can be made.

TABLE No. 2.

RAILROADS.	No of Passengers Carried.	Number of Train Accidents.	PASSENGERS.		PROPORTION TO WHOLE NUMBER OF PASSENGERS CARRIED.		
			Killed.	Injured.	Killed—1 in	Injured—1 in	Killed and In- jured—1 in
Berkshire,	177,816 ¹⁰	—	—	—	—	16,442,701	—
Boston and Albany, ¹	32,885,402	1	—	2	—	16,442,701	16,442,701
Boston, Clinton and Fitchburg, ²	1,714,271	—	—	—	—	—	—
Boston, Hartford and Erie, ³	7,542,125	—	—	—	—	—	—
Boston and Lowell, ⁴	9,786,179	2	—	13 ¹⁷	—	752,783	752,783
Boston and Maine,	26,758,477	1	5	30 ¹⁸	5,351,695	891,949	764,528
Boston and Providence,	17,713,677	1	—	1	—	17,713,677	17,713,677
Cape Cod,	1,618,014	—	—	—	—	—	—
Cheshire,	1,007,525	—	—	—	—	—	—
Connecticut River,	5,825,941	2	—	3	—	1,941,980	1,941,980
Eastern, ⁵	24,930,127	2	—	39 ¹⁹	—	639,234	639,234
Fairhaven Branch,	560,685	—	—	—	—	—	—
Fall River, Warren and Providence,	543,605 ¹¹	—	—	—	—	—	—
Fitchburg,	12,763,569	—	—	—	—	—	—
Hanover Branch,	134,134 ¹²	—	—	—	—	—	—
Hartford and New Haven,	4,089,350 ¹³	—	—	—	—	—	—
Lexington and Arlington,	1,597,426 ¹⁴	—	—	—	—	—	—
Middleborough and Taunton,	302,226	—	—	—	—	—	—
Nashua and Lowell, ⁶	4,396,693	—	—	—	—	—	—
New Bedford and Taunton,	1,598,263	—	—	—	—	—	—
New Haven and Northampton, ⁷	825,193	3	—	10	—	82,519	82,519
New London Northern, ⁸	2,613,983	—	—	—	—	—	—

British railroads, one in	.	.	.	.	.	430,000*
Massachusetts railroads, one in	.	.	.	.	.	1,475,000
Belgian railroads, one in	.	.	.	.	.	1,600,000
Prussian railroads, one in	.	.	.	.	.	3,000,000
French railroads, one in	.	.	.	.	.	4,000,000

The average length of each journey made by rail in Massachusetts is reported at 13 miles ; it would accordingly appear that upon a calculation of average chances any given person would accomplish 24,904,048 journeys of 13 miles each, or an aggregate journey of 324,000,000 miles before meeting with any accident resulting in death, and 19,000,000 miles before meeting with any resulting either in death or in personal injury.

Even during the year 1870-1, the most disastrous year as regards railroad accidents in the annals of the State, when the cases of death and injury among passengers from causes beyond their own control rose to 1 out of every 256,752 passengers carried†,—even in this year the average journey resulting in death was 12,400,000 miles, and that resulting in either death or injury was over 3,300,000 miles.

So far from indicating, therefore, either carelessness or disregard of human safety on the part of the railroad corporations in operating their roads, the most perfect statistics would seem decidedly to negative any such inference. It is of course impossible to wholly prevent the occurrence of accidents on railroads. The utmost care and skill can only reduce them to a *minimum*, while anything like neglect will increase them indefinitely. The railroad system is but a human agency for the transportation of persons and property, and the safety of that which is transported depends upon an infinite variety of conditions of every conceivable nature, from the state of the atmosphere to the strength of a nail. A positive derangement of any one of these conditions, dependent as they all are upon natural and human agencies, may lead at any moment to disaster. In con-

* The English method of computing the journey of season-ticket passengers differs from that used in Massachusetts. The figures given by Captain Galton are changed to make the necessary allowance for this variation of returns.

† During the year 1870, the proportion of passengers killed and injured on the railroads of Great Britain, from causes beyond their own control, computed on the basis of returns used in Massachusetts, was one in every 372,098.

cluding this part of their Report, therefore, the Commissioners feel constrained to say that, instead of charging the railroad companies with habitual recklessness, the result of their investigations has led them to regard the combination of speed and safety with which human movement is kept up by rail as perhaps the most remarkable result accomplished through an unceasing exercise of human care, skill and foresight which has ever come within their range of observation.*

Apart, however, from accidents occurring exclusively to passengers and from causes beyond their own control, a similar popular impression also exists as to the reckless management of American railroads as regards employés of corporations and the public other than passengers. The Commissioners have also to a certain extent investigated this subject, and the result of their examination has tended somewhat conclusively to show that the generally received conclusion is as erroneous in this respect as in the other. The material for a comparison of a very unreliable nature between the results on this point reported on the state railroad of Belgium, the railroads of Great Britain and those of Massachusetts is supplied in the accompanying table. (Table No. 3.) The figures in this table relating to the Belgian road probably set forth the exact and complete facts in the case. Those relating to the British and Massachusetts roads are manifestly imperfect, but the best which can be obtained. So far as any reliable inference can be drawn either from Table No. 3 or from an examination of the returns in detail it would seem that, making every reasonable allowance for the imperfection of statistics, the amount of deaths and personal injuries of every description and arising from all causes annually incident to the operation of the railroad system of Massachusetts does not materially differ from that experienced in European countries.

As regards the causes of accidents also, the commonly received idea that a certain description of railroad disasters, generally those of a most distressing character, are peculiar to America, does not seem sustained on a more careful investiga-

* During the ten years examined by the Commissioners, in which eight deaths were occasioned by train accidents on the whole railroad system of the State, there were, in the city of Boston alone, 1,663 deaths from accident, besides 73 homicides and 93 deaths from sunstroke.

TABLE No. 3.

[illegible]

tion. As will hereafter be seen, the causes of accidents in all countries are very similar. As regards the Revere accident, for instance, reference has already been made to the assertion, frequently made immediately after its occurrence, to the effect that such an accident could not possibly have occurred in Europe. How unwarranted this assertion was is made apparent by the following facts. It will be noticed that in the statement of Captain Galton, the railroads of France are pre-eminent for their freedom from accidents. On the 4th of September, however, on the *chém-in-de-fer du Nord*, an "omnibus" train, 50 minutes behind time, was run into at a station called Seclin, near Lille, by the Paris express and three of its cars were completely demolished. The "omnibus," or accommodation train, was in this case in the act of being switched on to a siding, the express train was moving at a high rate of speed at the moment of collision, the steam escaped from its locomotive, and the debris of the cars caught fire. Nine passengers were killed on the spot, 75 were very seriously injured, generally by scalds and burns, a number of whom subsequently died; the merely bruised were not enumerated. The accident was caused by the failure of an employé in charge of a semaphore signal to give the necessary notice that the track was closed.

On the 13th of December 1871, the "tidal" express train from Paris to Boulogne with London passengers, while going at full speed ran into a locomotive which was "manœuvring," as the report expressed it, upon the track, near Chantilly. Both locomotives were destroyed, and seven employés and twelve passengers were injured. Both of these accidents, it will be noticed, have happened since the occurrence of the collision at Revere.

The following extracts from the very valuable report of Capt. H. W. Tyler to the Secretary of the Board of Trade on railway accidents in England in 1870, affords conclusive evidence that disasters like that at Revere are not unknown in Great Britain :—

"As four London & North Western excursion trains were returning from a volunteer review at Penrith, the fourth came into collision at Penruddock with the third of those trains. One hundred and ten passengers and three servants of the company were injured ;

* * * *the regulations for telegraphing the train were altogether neglected."*

"A passenger train, following close upon another passenger train, came into collision with it at Brighouse, in the absence of a better system for securing intervals of space between the trains, and of better accommodation at the station for a very crowded traffic. One passenger was killed, and nineteen passengers and one servant of the company were injured. *The results would have been far more serious if the running train had not been provided with continuous brakes."*

"A London & North Western passenger train came into collision at Ashton with part of a Lancashire & Yorkshire goods train which was being shunted. * * * Three passengers were injured. * * * *There was a want of locking apparatus at a junction passed, 'on the Lancashire & Yorkshire line alone,' by 270 regular trains in the twenty-four hours."*

"An auxiliary mail train, approaching the Carlisle station at an incautious speed, with all signals lowered, came into collision with an empty passenger train standing at the platform. Twenty-six passengers were injured. * * * *There were only three brakes out of 26 vehicles in the train."*

"A fast passenger train from Liverpool to Manchester came into collision in a fog with a Tyldesley passenger train which preceded it * * * six passengers were injured."

"An express passenger train from London came into collision at Harrow with a portion of a goods train, which had been delayed by the fracture of a coupling. Seven passengers and one servant of the company were killed, and forty-one passengers and three servants of the company were injured."

"A passenger train from Manchester to Bowden came into collision, at Altrincham, with a combined train about to leave that station for Northwich. Eighteen passengers were injured."

"A passenger train from Paddington to the city overtook and came into collision with a preceding passenger train at the King's Cross station. Twelve passengers injured. * * * *The block interval was thus reduced from five-eighths of a mile to 76 yards. * * * There were 469 trains, including both directions, passing King's Cross station daily."*

"A passenger train from Derby to Ripley came into collision near Derby in a fog with a passenger train from Derby to Manchester. Twenty-five passengers and four servants of the company were injured. * * * *The block telegraph system had been aban-*

done, as 'inconvenient and almost impracticable' on this portion of the line."

Those given above are a few of the cases classified in Captain Tyler's report under the head of "Collisions between Engines and Trains following one another on the same line of rails, or at Stations or Sidings." Under this head were returned 61 accidents for the year 1870 alone, resulting in 14 deaths and 592 cases of injury.

The ascertainment of the comparative degree of safety in travelling on the railroads of Massachusetts and those of other countries was not, however, the end the Commissioners had in view in entering upon their investigations. They have no desire to underestimate or to defend any shortcomings or defects in management which may exist on the roads of the State; they have, in fact, rather been charged with unduly magnifying everything of the sort. The only useful result to be arrived at through their inquiries was the attainment of a greater degree of positive safety; to accomplish this it was necessary to form some reliable opinion as to what additional precautions against accident could usefully be adopted. An examination and consequent classification of accidents could alone supply a basis for action on this point. The Massachusetts returns contain an incomplete record of the accidents of the last 25 years. The statements in the several cases are so very meagre that they do not supply the material for a satisfactory analysis of causes, but the accompanying table contains as perfect a classification in this respect as it was found practicable to make. (Table No. 4.)

The review of the railroad history of Massachusetts necessarily made in the preparation of this table conclusively established the fact that it was singularly free from the record of serious train accidents.* The following are in fact the only

* The following are a few of the more disastrous railroad accidents which have occurred in this country during the last twenty years:—

May 6th, 1853. The Norwalk Bridge accident. Forty-five persons killed and some thirty injured.

July 5th, 1854. A collision between an excursion train of twelve cars and an accommodation train took place on the Baltimore & Susquehanna railroad. The excursion train was being pushed at the time of collision by its locomotive and some six cars were crushed. Twenty-nine persons killed and over fifty injured.

October 27th, 1854. A passenger train from Niagara on the Great Western railroad of

TABLE No. 4.

	NATURE OF ACCIDENT.	Whole No. of Accidents.	EMPLOYEES.		PASSENGERS.		OTHERS.		Killed and Injured.
			Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	
<i>Cases attributable to carelessness of parties injured.</i>									
1	1. Unlawfully or carelessly on track, . . .	665	18	2	-	-	570	98	688
2	2. Attempting to get on trains in motion, . . .	202	18	7	86	45	31	15	202
3	3. Attempting to get off trains in motion, . . .	179	12	7	92	57	8	4	180
4	4. Falling from trains in motion, . . .	214	104	25	48	15	17	5	214
5	5. Crossing track in front of train, . . .	189	12	4	1	2	132	44	195
6	6. Lying on track, . . .	105	-	-	-	-	86	19	105
7	7. Leaning from train in motion, . . .	12	9	1	2	-	-	-	12
8	8. Crossing track under cars, . . .	6	-	-	-	-	5	1	6
9	9. Arm out of car window, . . .	5	-	-	-	5	-	-	5
10	10. Suicides, . . .	14	-	-	-	-	14	-	14
	Total, . . .	1,591	173	46	229	124	863	186	1,621
<i>Cases attributable to causes which admit of control by government or management.</i>									
<i>(a) Defects of structure,—</i>									
11	1. Crossings at grade, . . .	96	-	-	-	-	69	80	149
12	2. Derailment at switch, . . .	7	5	1	2	1	-	-	9
13	3. Derailment by expansion of rails, . . .	1	-	-	1	26	-	-	27
14	4. Derailment by cattle, . . .	7	3	1	1	-	-	-	5
15	5. Derailment at junction, . . .	2	-	3	-	-	-	-	3
16	6. Striking overhead bridge, . . .	159	112	40	1	-	4	2	159
17	7. Giving way of a bridge, . . .	1	1	-	-	-	-	-	1
	Total, . . .	273	121	45	5	27	73	82	353

18	(b) Collisions,—	33	14	21	26	89	2	2	154
19	1. Collisions, head,	4	1	1	32	59	—	—	93
20	2. Collisions, rear,	5	5	2	—	—	6	6	19
21	3. Collisions on sidings,	1	1	—	—	—	—	—	1
22	4. Collision of engines,	1	1	—	—	—	—	—	1
	5. Collisions at railroad grade-crossing,								
	Total,	44	22	24	58	148	8	8	268
23	(c) Defects of rolling stock,—								
24	1. Derailment from breaking of axle or wheel,	10	17	7	9	16	—	—	49
25	2. Explosion of engines,	12	20	1	—	—	1	1	23
26	3. Explosion of oil cars,	3	2	—	—	—	1	—	3
27	4. Passing from car to car while train in motion,	18	8	—	8	2	—	—	18
28	5. Falling between cars,	31	12	4	8	4	2	3	33
	6. Crushed by shifting or coupling cars,	150	103	43	—	—	1	3	150
	Total,	224	162	55	25	22	5	7	276
29	(d) Struck by engine while leaving car on wrong side,	3	—	—	2	1	—	—	3
30	(e) Falling of train through draw,	2	1	—	5	4	—	—	10
31	Cases attributable to miscellaneous causes,—								
32	1. Derailment of hand-car,	2	4	2	—	—	—	—	6
33	2. Derailment by snow,	2	2	—	—	—	—	—	2
34	3. Thrown from top of freight car,	14	9	3	1	—	1	1	15
35	4. Thrown from hand-car,	14	7	7	—	—	—	—	14
36	5. Thrown under gravel or freight train,	9	6	1	—	—	2	—	9
37	6. Falling under engine,	17	7	—	—	—	9	1	17
	7. Concussion in sudden starting or stopping of train,	3	—	1	—	3	—	—	4

TABLE No. 4—Continued.

	NATURE OF ACCIDENT.	Whole No. of Accidents.	EMPLOYEES.		PASSENGERS.		OTHERS.		Killed and Injured.
			Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	
38	8. Thrown from platform by sudden starting,	3	2	—	1	—	—	—	3
39	9. Killed while working on track, . . .	6	6	—	—	—	—	—	6
	Total,	70	43	14	2	3	12	2	76
40	Derailment from causes not stated, . . .	25	17	5	8	10	—	—	40
41	Miscellaneous,	87	38	27	—	2	12	9	88
Whole number of accidents,									
Employés killed,									
Employés injured,									
Passengers killed,									
Passengers injured,									
All others killed,									
All others injured,									
Whole number killed and injured,									
							2,319		
							577		
							216		
							337		
							338		
							973		
							294		
							2,735		

cases of the sort which seem to have resulted in any considerable loss of life or infliction of personal injuries.

1. November 6, 1847. By the falling of one end of a brake a car was thrown off the track of the Boston & Worcester road in Brookline and was crushed against the abutment of the bridge. Six persons were killed and four or five seriously injured.

2. November 3, 1848. A collision of extra trains took place at Marblehead Junction on the Eastern railroad. Six persons were killed and some thirty-three injured.

3. January 6, 1853. A car of the Boston & Maine road at Andover was thrown from the track by the breaking of an axle. Three persons were killed (one the only son of President Pierce) and several were injured.

Canada ran into a long gravel train backing towards it. Forty-seven persons were killed and some sixty injured.

August 29th, 1855. A passenger train on the Camden & Amboy road while backing ran into a wagon, and the four last cars of the train were thrown down an embankment. Twenty-five persons were killed and some sixty injured.

November 1st, 1855. An excursion train of eleven cars on the Pacific railroad of Missouri on the occasion of the opening of the road, was crossing the bridge over Gasconade River, when the bridge gave way, precipitating the train thirty feet into the water. Twenty-two were killed and some fifty injured.

July 17th, 1856. A collision took place on the North Pennsylvania road between an excursion train of ten cars, containing some 500 children with their teachers, and a regular train. Five cars were burned, sixty-six persons were killed and over one hundred injured.

March 12th, 1857. A locomotive ran off the track of the Great Western Railroad of Canada while approaching the bridge over the Des Jardines canal. The train fell through the bridge and crushed through the ice into 18 feet of water. Sixty persons were killed and a large number wounded. In this case it was thought that a self-coupler would have saved the rear cars of the train, which were, however, both linked and chained to the forward cars and were dragged over by them.

June 17th, 1858. A passenger train on the Erie road, near Port Jarvis, encountered a broken rail. The last two cars were thrown from the track and precipitated down a 30 foot embankment. Six persons were killed and fifty injured. In this case had the coupling held no injuries to persons would have been sustained. The cars ran 25 rods after derailment, before the coupling broke.

June 27th, 1859. A passenger train on the Michigan Southern road was precipitated into a rivulet near South Bend by the giving way of a culvert. Thirty-four persons were killed and some fifty injured.

April 14th, 1867. A night express train was thrown from the track at Carr's Rock on the Erie railway, by a broken rail, and rolled down an embankment. Twenty-four persons were killed and eighty injured.

February 6th, 1871. A night express train on the N. Y. Central & Hudson River road was thrown from the track on a bridge near New Hamburg by collision with an oil car. The locomotive and one or two cars were precipitated through the ice and others set on fire. Twenty-one persons were killed and a large number injured.

4. August 12, 1853. A collision occurred between an excursion and a regular train near Valley Falls on the Providence & Worcester road. This accident, properly speaking, did not take place in Massachusetts. Thirteen persons were killed and some twenty-five injured.

5. September 11, 1856. A passenger train was thrown from the track near Reading, on the Boston & Maine road, through the breaking of one of the axles of the tender. Four persons were killed and a number injured.

6. October 26, 1860. The rear car, containing some thirty passengers, of the steamboat express, on the Old Colony & Fall River road was thrown from the track near Assonet, while moving at the rate of 35 miles an hour, was capsized and dragged on its side nearly a quarter of a mile. No one was killed; three persons were seriously, and a number were slightly injured.

7. September 17, 1862. A collision between an excursion and a regular train took place in Wenham on the Eastern railroad. One person was killed and some thirty-two persons were injured.

8. November 21, 1862. The Reading passenger train on the Boston & Maine railroad ran into the draw of the bridge over Charles River. Six persons were killed and thirty were injured.

9. January 10, 1864. A car was thrown off of the track of the Boston & Lowell road near College Hill. No person was killed; fifteen persons were injured.

10. June 16, 1869. A passenger train was thrown from the track on the Vermont & Massachusetts road in Athol and was precipitated into Miller's River. Three persons were killed and twenty-two were injured.

The examination of the Commissioners, however, disclosed the somewhat interesting fact that three accidents of a precisely similar character and accompanied by the same circumstances, except as regards loss of life and personal injury, had in this State preceded the Revere collision.

The first of these took place on the morning of the 28th of March, 1850, on the Boston & Lowell railroad in the town of Medford. The engine of an accommodation train which left

Boston at 7.05 A. M. met with a slight accident and was obliged to stop for repairs. A severe snow storm was prevailing at the time and the 7.30 express train from Boston overtook the accommodation train and collided so violently with it that the engine of the latter train stove in the rear car of the former train, stopping inside of its shell. The alarm had in this case been given in time and most of the passengers, few in number, escaped; two only were seriously injured, and the fireman of the colliding train in jumping off to save himself so injured his arm that amputation was necessary.

The second of these accidents occurred on the Fall River road on the evening of November 21, 1853. The steamboat express was disabled by the breaking of the axle of a second-class car and obliged to stop. An accommodation train was following it, but, though the conductor of the disabled train hurried back to give notice of danger, owing to the foggy state of the atmosphere his signal was not seen in time, and a collision ensued of such violence that the colliding locomotive and most of its tender were buried in the rear car. The steam at once escaped from the boiler and of the few passengers in the car one was killed and a number more or less injured, principally by scalding.

The third of these rear collisions took place on the Salem & Lowell road on the 27th of August, 1864. This road was operated jointly by the Boston & Lowell and the Eastern companies. As a Boston & Lowell train was passing Fry's Mills, near Salem, it encountered a load of hay entangled at a grade-crossing. The train stopped and very shortly afterwards the Lawrence train of the Eastern company followed round the curve striking the train so forcibly that the locomotive ran half its length under the Lowell cars. Several were injured in this accident, but no one was killed.*

* A similar accident took place on the Housatonic road on August 16, 1865, but not within the State of Massachusetts. A new engine out on an experimental trip ran into the rear of a passenger train which was at the time backing towards it. In this case the colliding locomotive ran wholly through the rear car and into the one next to it, where its boiler burst. Eleven persons were killed, and some seventeen badly injured by crushing, scalding etc.

An accident precisely parallel to that at Revere occurred at Bristol N. J., upon the Camden & Amboy road, on March 7, 1865. The Washington express for New York ran into the rear of a Kensington and New York train which was two hours behind time. In this case the express train was going at a high rate of speed and its engine

The most remarkable feature in the classification presented in Table No. 4 is the very small proportion of casualties for which the companies are responsible as compared with the large proportion directly attributable to the recklessness of the persons injured. Forty-five per cent. of all the accidents examined, resulting in 835 deaths and 235 cases of injury, or 39 per cent of the whole aggregate of killed and injured, fell under the two headings of "Unlawfully or carelessly on track," and "Getting on or off trains in motion," these two headings, with certain facts connected with the heading "Striking overhead bridge," will sufficiently illustrate this point.

The practice of unlawfully walking on the tracks of railroads has twice before been referred to in the reports of this Board. (Report 1870, p. 92. Report 1871, p. 25.) More deaths and cases of personal injury have arisen from this cause alone than from all the train accidents which have ever occurred in the State. The whole number of deaths from train accidents, properly speaking, has been 172, with perhaps 250 cases of injury; 570 deaths and 98 cases of injury are reported to persons walking on tracks, and this does not include 105 other cases (86 deaths, 19 injuries) to persons lying on the track, or the 195 cases (132 deaths, 44 injuries) of persons crossing the track in front of the locomotive; or the 14 cases of suicide. Not only is the practice very dangerous in itself, but it has always been forbidden by law (Gen. Laws, Chap. 63, § 102). At the same time it is one which it is found impossible to prevent, either in this country or abroad. No less than 57 trespassers, for instance, as they are there called, were killed, and 9 were injured on the railroads of Great Britain and Ireland in the year 1870, 105 in 1869 and 45 in 1868. As a rule, no attempt is made in this country to enforce the law prohibiting the practice; certain roads have, however, at points where accidents most frequently occurred, undertaken to arrest trespassers and to enforce against them the penalties of the law. This action has excited so much hostility in the neighborhood that obstructions have immediately after been found placed secretly on the track. In attempting to protect trespassers, therefore,

shattered to pieces the rear car of the preceding train, and buried itself in the next car. The steam escaped, the cars caught fire and ten passengers were crushed, scalded or burned to death, while some forty were injured.

the corporations found that they were jeopardizing the safety of their own passengers and employés. In this case neither personal risk nor respect for the law suffices to restrain great numbers from a practice found to be somewhat convenient.

So also as regards entering and leaving trains in motion, or leaving trains on the wrong side. These are the second most fruitful cause of accident, resulting in 16 per cent of the casualties. It is well nigh useless to pass laws or to attempt to enforce regulations wholly opposed to the habits of the community. The American people have always been accustomed to take care of themselves, and no law or regulation looking to their safe confinement in cars or in waiting-rooms, or prescribing on which side they should enter or leave trains could practically be enforced. If they could the railroad corporations would unquestionably be glad to adopt and enforce them. Under the circumstances, however, it would seem more reasonable to afford every appliance for safety in these respects, and then, within reasonable limits and after due notice of danger given, to leave people to take care of themselves.

Another striking illustration, in two respects, of the inherent recklessness both of individuals and of the community at large is furnished in the case of grade crossings and overhead bridges. Both grade crossings and bridges as they have hitherto been constructed, have proved fruitful causes of death and personal injury; the one to travellers on highways, the other to brakemen standing on the top of freight cars. Of the two the overhead bridge has occasioned the greater number of casualties, there having been reported 117 cases of death and 42 of injury from this cause, to 69 deaths and 80 injuries from the other. The original height of bridges on Massachusetts roads was about 14 feet in the clear. The increased size of rolling stock rendered this insufficient and 18 feet was prescribed by law for bridges thereafter constructed (Acts 1869, Chap. 308). Meanwhile it was sought to provide for the safety of brakemen in passing under all bridges of less than the standard height by directing bridge-guards to be placed before them. These guards gave the brakemen notice of the proximity of the bridge and, though they at times injured them and frequently annoyed them by blows, yet in practice it has been found that they in a very great degree prevent the occurrence of this class of acci-

dent. It has, however, also been found on certain roads extremely difficult to keep these guards in use, owing to the fact that the brakemen themselves destroy them. They prefer to take their chance of death from the bridges, rather than to be continually annoyed by raps from the guards. The only absolute protection against this class of accidents would seem to be found in the erection of 18-foot bridges. Here, however, a new difficulty is to be encountered. These bridges are even more unpopular with those using the highways than are the bridge-guards with brakemen. Bitter opposition is made to them on account of the increased strain they impose on all draught animals. As a consequence, whenever a new railroad is now constructed, or a new highway laid out, the residents in the vicinity almost invariably petition that the crossings shall be at grade; especially is this the case in all crowded neighborhoods and in the vicinity of Boston. Cases have recently come before the Commissioners, and others can be cited, where the advocates of new thoroughfares have refused to accept a bridge, even when it was urged upon them, and have preferred temporarily to give up the desired way rather than be subjected to the inconvenience necessary to preserve them from the dangers and certain disasters of a grade crossing. Within the last year corporations against their strongest remonstrance have had such crossings laid out across their roads in place of bridges and at very dangerous points of approach. The Commissioners are satisfied that some distressing calamity, which they are wholly powerless to prevent, must ultimately occur at certain crossings,—as for instance at the Western Avenue crossing in Brookline; but they greatly fear that nothing but such an accident will cause that remedy to be applied which soon or late must be applied, though at a cost greatly aggravated with each year of delay.

The opinion of the Commissioners on this point is perfectly well known and does not need to be repeated. Every grade crossing and every overhead bridge, less than 18 feet in the clear above the track, with absolute certainty involves, soon or late, death or personal injury to a given number of persons. Not only should no more of either in future be constructed, where it is possible to avoid them, but those already in existence should gradually be replaced. If, however, the majority of the

community think otherwise it is impossible for the Commissioners to effect any essential reform in this respect, especially as jurisdiction in the premises belongs not to them but to the county commissioners. The alternative should, nevertheless, be distinctly understood; it is, that the community accepts as the price of its unwillingness to submit to an inconvenience a certain regular percentage of casualties.

Passing from the consideration of accidents arising from the various causes against which it is almost impossible in the nature of things for the companies to provide, it was found that the other class of casualties could generally be traced to some defect under one or more of the following heads:

- (1.) Derailment by breaking of axle or rail.
- (2.) by expansion of rail.
- (3.) by defective switch.
- (4.) by reason of insufficient cattle-guards.
- (5.) Collisions caused by carelessness of employés.
- (6.) by imperfect regulations.
- (7.) by defective signals.
- (8.) by want of telegraphic communication.
- (9.) by want of brake power.
- (10.) by railroad grade-crossings.
- (11.) by breaking through bridges owing to want of guards.
- (12.) by falling of train through draw.
- (13.) by concussion in starting or stopping train.
- (14.) by falling between cars while passing through train in motion.
- (15.) by explosion of locomotives.

Apart from anything peculiar to the management of the Eastern railroad company the following causes of a general nature seem to have essentially contributed to the occurrence of the Revere disaster.

1st. A deficiency in the system of signals by which an interval either of space or of time was insured between trains following each other;

2d. The want of a complete telegraph system which should keep the central office fully advised at all times of the exact

position of each train on the road, and in communication with all of such trains at the several stations ;

3d. To an insufficiency of brake power ;

4th. To the use of tail-lights of insufficient penetrating power.

This special analysis of causes, together with the preceding general one, the Commissioners compared with two other similar analyses of causes of accidents which had happened in Great Britain ; the one made by Mr. Brunlees and submitted to the Institute of Civil Engineers,* and covering the years from 1854-60 inclusive ; the other contained in the report of Captain Tyler already referred to.

That of Mr. Brunlees was as follows :—

Insufficient accommodation,	58
Insufficient establishment,	61
Want of engine power,	17
<i>Want of brake power,</i>	65
Want of communication with locomotive,	31
<i>Want of adequate signals,</i>	88
Want of time-pieces,	15
Want of turn-tables,	2
Unpunctuality,	50
<i>Insufficient or badly enforced regulations,</i>	198
<i>Insufficient interval between trains,</i>	70
<i>Negligence of employés,</i>	211
Speed too great for class of road,	8
<i>Want of electric telegraph,</i>	97

Out of 975 causes contributing to the accidents analyzed in making this table, 729 were common to it with the analysis made by the Commissioners of Massachusetts accidents.

The analysis of Captain Tyler (Report, p. 33.) refers the accidents investigated, 122 in number, to the following contributing or combined causes :—

Fractures of coupling,	4
Defective maintenance,	9
Defective construction,	12
Defective accommodation for traffic,	16

* Minutes of Proceedings. Vol. 21, p. 346.

Insufficient or inexperienced staff, or too long hours of duty,	12
<i>Insufficient brake power,</i>	10
<i>Defective signal and switching arrangements,</i>	60
Want of means of ascertaining correct time,	2
<i>Want of improved regulations or defective discipline,</i>	27
<i>Want of telegraphic communication, or of system for securing intervals of space between trains,</i>	43
<i>Mistakes or negligence of employés,</i>	88
Excessive speed with reference to conditions of road or rolling stock,	2
Foggy weather,	17
Improper interference by persons not under control of the companies,	2

Of the 308 contributing causes specified in this analysis, 228 were common to it with the analysis of the Commissioners. It seemed, therefore, not unsafe to conclude that the above included all the ascertainable causes of railroad accident, and that any system which adapted and vigilantly used all the appliances best calculated to prevent the occurrence of accidents, so far as they were preventible, arising from these causes was doing all that could be required of it to secure the safety of travellers.

Acting upon these analyses and such general information as they could procure, after frequent consultations with the members of the several citizens' committees, and the committee of railroad officials appointed to advise with them, the Commissioners finally united with the latter body in making nine recommendations to the railroad corporations of the State. As will be noticed they covered only the causes of accidents numbered 6, 7, 8, 9, 13 and 14 in the analysis of the Commissioners (p. cxxix). The causes numbered 1, 2, 5 and 15 were manifestly beyond the control of legislation, or even of the railroad companies themselves, except to a limited extent. Those numbered 3, 4 and 12 were already sufficiently provided for on the statute book. There remained only those numbered 10 and 11, and these have already been made the subject of as emphatic recommendation by this Board, both to the legislature and to the corporations, as it is in its power to make (Second Annual Report, 1871, pp. 26, 27, 30). The recommendations of the

Commissioners as agreed to by the committee of railroad officials were as follows :—

I. A revision of the rules under which the several roads are operated.

II. The general adoption, at the earliest possible time consistent with a reasonable regard to the present condition of passenger rolling-stock, of brakes operated from the locomotive and enabling the engineer at all times to control his train.

III. The construction of all new passenger cars in such a manner as to prevent telescoping in case of accident, and the change of existing cars in this respect within a reasonable time in the regular course of repairs.

IV. The adoption of some approved standard heating apparatus, properly secured, to obviate in the greatest possible degree all danger from fire in case of accident.

V. The disuse on passenger trains of any illuminating substance other than candles or a fluid incapable of ignition at less than 300° Fahrenheit.

VI. The substitution of Fresnel lanterns in place of the ordinary tail-lights now in use.

VII. The general adoption of a rule prescribing that a brakeman shall be stationed upon the last car of every train, whether freight or passenger, who shall be known as the "signal brakeman," and whose special duty it shall be to have charge of all train-signals, and to immediately provide for the safety of the rear of the train in case of danger.

VIII. The adoption of a uniform dress or cap for all employes whose duty brings them into contact with the travelling public.

IX. The general use of the telegraph in aid of the present time-table system.

In accordance with these recommendations a schedule of general rules for the operation of all the railroads of the Commonwealth was prepared by the Commissioners, approved by the committee of railroad officials after careful revision and much harmonious discussion, and will undoubtedly be very generally adopted. A copy of these regulations is printed in Appendix F of this Report. A comparison of the various codes of

rules now in use on the several railroads of the State made the expediency of this reform very manifest. Three corporations only, operating in all but 142 miles of road in the State, made use of the same set of rules, and in this case, though well arranged and clear, the rules were unnecessarily long, numbering no less than 220, besides some 40 additional running rules. Regulations for operating railroads should be as short and as few in number as possible, and so systematized that each employé can at a glance ascertain his own peculiar duties. In the case of these three roads the code prepared by the Commissioners reduced the number nearly one-half. Other roads again were found to be operated under a great number of rules put together without apparent system and exceedingly difficult to understand. One small road had no printed regulations, others very few; very few allusions to the telegraph, or to the duties of employés on receiving train despatches were found in the whole collection. In very many cases the rules of the different roads guiding employés in relation to the same subject-matters were at variance. It is confidently hoped that the general adoption of the system proposed will tend, through its uniformity, to an increased acquaintance with their duties among employés, and hence to a greatly improved discipline; the public, also, will gradually become familiar with these rules and consequently with their own rights and obligations.

It is not deemed necessary to comment at any length on the propriety of each of the foregoing recommendations. The necessity of the train-brake was illustrated in the Revere collision. Could the engineer in that case, instead of whistling "brakes," have himself applied the brakes by an effort no greater than was required to give the signal, it scarcely admits of doubt that the collision would have been averted. The great advantage enjoyed by the Westinghouse and Steinard brakes, over most other train-brakes which have been experimented with, is that they are in constant use and are not reserved for emergencies, when they are apt not to be in order. Neither is the use of either of these improvements at all incompatible with the application of the brake by hand should the train apparatus be out of order. The economy as regards time, in making regular train-stops where this brake is in use, is also an important consideration; those who have had the greatest experience with it

estimating the saving at 45 seconds to the stop. Where stations are close together, as on the roads in the vicinity of Boston, the importance of this saving in time is very obvious. The general adoption of train in place of hand-brakes may be considered a mere question of time, and the Commissioners have reason to believe that the change in this respect is now being effected upon the roads of Massachusetts with as great rapidity as can reasonably be expected.

The third recommendation was modified at the request of the committee of railroad officials, and is expressed in more general terms than was originally intended. The high opinion entertained by the Commissioners of what is known as the Miller buffer-platform, as an improvement in car construction both as regards comfort and safety, has already twice been expressed in previous reports. (Rep. 1869, pp. 90-1. Rep. 1870, p. 14.) By its general adoption alone can full effect be given as yet to the third recommendation. Objection has been made to its adoption upon certain Massachusetts roads on the ground that by bringing the cars of a train into firm contact with each other, it would not allow the play or slack necessary for starting trains on a rising grade, or in certain conditions of the track; and, also, that being a self-coupler it subjected trains to danger of parting in rounding sharp curves or in case of derailment. Upon no point in connection with rolling stock do the highest authorities differ more than upon the relative advantages and disadvantages of the self-coupling apparatus. Accidents, and very serious ones, like those at the Des Jardines canal and at Port Jarvis for instance (*ante*, p. 123), could be referred to by the Commissioners, which have arisen, or been greatly aggravated, in the one case by the train having been held together, so that one part unnecessarily dragged another to destruction, and in the other case from the train having uncoupled and come apart so that disconnected cars were destroyed, simply for want of the support of the rest of the train. Any objection to the self-coupler on this score is obviated by the simple use of connecting chains. The suggested difficulty in starting trains with the buffer-platform in use is a purely practical one. Upon this point the Commissioners applied for information to Mr. C. E. Perkins, Superintendent of the Burlington & Missouri River R. R. Co., who has

had great experience of the buffer-platform on a road presenting far greater difficulties of the sort referred to than any road in Massachusetts. His reply to their inquiries would seem to be fairly conclusive on the practical question involved and will be found in Appendix G of this Report. The buffer-platform, however, has great advantages over the other forms of car construction now in use in various respects, especially as regards the jerking of trains in starting or stopping, safety in passing from car to car, the use of train-brakes and resistance in case of collision. As regards all these matters, however, the Commissioners desire simply to refer to the very valuable communication addressed to them by Mr. Isaac Hinckley, President of the Philadelphia, Wilmington & Baltimore R. R. Co. The great and very generally recognized authority of Mr. Hinckley upon questions relating to railway equipment and management lends great value to his opinions, and the Commissioners have been placed under much obligation to this gentleman, who rendered them most important assistance throughout their investigations, and by whose advice they were largely guided. The communication referred to will be found in Appendix G of this Report.

The propriety of the changes and additional precautions suggested in recommendations IV. and V., seem too obvious to require comment. Recent inventions have wholly obviated any necessity for using kerosene, or any other explosive or quickly igniting oil for the lighting of cars. All such add greatly to the horrors of the worst forms of railroad accidents, for, even if they do not themselves explode or ignite, by saturating upholstery and furniture with inflammable matter, they largely increase the danger from fire.

Recommendation VI. was especially insisted upon by the commissioners and was finally acceded to. The investigations made in consequence of the Revere accident disclosed the fact that collisions of trains following each other on the same line of tracks were of not infrequent occurrence, and were peculiarly liable to occur on foggy nights. It has already been stated in this Report that in the case of the Revere collision the reflecting head-light of the following locomotive was distinctly seen by a passenger standing at the rear of the Beverly train, and that, in the judgment of this person, an ordinary tail-lantern,

such as those with which that train was equipped, could not have been seen at the same distance.* The accidents of 21st November 1853 on the Fall River road, and of 7th March 1863 on the Camden & Amboy road, beside the Seclin collision and several of those referred to in England, seem not improbably referable to the same cause. No stronger illustration of the necessity of this simple and inexpensive precaution could, however, be furnished than was furnished at Revere.

The propriety of the changes and additional precautions suggested in the fourth and fifth recommendations seems too obvious to require comment. The eighth recommendation also was suggested by the facts disclosed in connection with the Revere disaster. The extreme disorder habitually, according to the evidence, prevailing in and about the Boston station of the Eastern railroad was in no small degree attributable to the difficulty experienced by those using the station in recognizing the employés of the company, so as to enable them to obtain correct information as to the position and movement of trains. The same trouble notoriously exists throughout the railroad system of the Commonwealth. All travellers, and especially women and children, are continually perplexed and rendered anxious by their inability to recognize employés at sight. These are generally dressed as civilians, with the exception perhaps of some obscure badge or label. How great an inconvenience this fact occasions and how injurious it is to good discipline is only appreciated by travellers when they pass onto some road or steamboat where another system prevails. There is in fact more real necessity, so far as the public convenience is concerned, that all railroad employés, who are brought by their

* This fact is of such importance that the Commissioners take the liberty of printing the extract relating to it from the private letter addressed to them by Mr. Arthur T. Lyman of Boston, the passenger referred to. "While standing at the rear door of the rear car of the Beverly train on the evening of 26th August last, after leaving Chelsea and before stopping at Revere, I saw behind us the head-light of an engine, which I supposed was that of the Bangor express. *It looked dim*; but I positively saw the light. The distance I could not estimate in the darkness and fog * * * Soon the light came in sight again, I think rather less than three-quarters of a minute before the collision * * * In direct answer to your question I am decidedly of the opinion that the ordinary red tail-lights could not have been seen by the engineer of the express train at the time when I saw the head-light of the express engine; or if they were perhaps absolutely *visible*, yet that they were only so to such a degree as, at the distance at that time, to be practically invisible, and that no one on the engine could have been reasonably expected to see them."

duties in contact with travellers, including conductors, depot and baggage masters, brakemen and private police, should be uniformed than that the regular police should be. The reason for such a regulation is in each case the same, but the appeals of all descriptions made by strangers to railroad employés are probably much more frequent than those made to policemen. Upon this point the Commissioners suggested an entire uniform. This would have remedied the evil. The officials of the roads, however, did not deem it necessary to go so far, and a distinctive cap and band were finally settled upon as sufficient.

It was only as regards signals and the use of the telegraph in operating their roads that the Commissioners and the committee of officials were unable to arrive at a thoroughly satisfactory understanding. The suggestions originally made in this respect by the Commissioners were as follows :—

IX.—The general adoption upon all single-track roads and branches of a system of telegraphic control of trains in addition to the present time-table system.

This was returned by the committee amended so as to read —“The general use of the telegraph in aid of the present time-table system,” and agreed to as amended.

X.—Wherever, upon any road, trains are intended to run within ten minutes’ of each other, the adoption of a system of telegraphic communication from station to station, enabling each train to be fully informed as to the condition of the track to the next station ahead. Or in lieu of a system of signals providing for intervals of *space* between following trains, a system which shall provide for a certain interval of *time* between such trains.

This was returned with the following indorsement :—“Of questionable expediency. The committee deem the accompanying rules a sufficient provision for securing the object the Commissioners have in view.” (See Rules 37 and 121, Appendix.)

XI.—That an acquaintance with telegraph operating shall, in future, be made one of the essential requirements in the case of all applicants for certain positions under the railroad companies, in the same way that reading and writing now are.

This was endorsed as follows :—

“In view of the possible failure of the telegraph when most relied upon, the committee fear that disaster would be increased and aggravated by a dependence upon its operation in the hands of persons who would have only infrequent occasions for its use. They are also confident that the interest which the Commissioners have excited on the whole subject of safety signals will lead to better results in the adoption of such as are suited to the circumstances of the respective roads than can reasonably be expected from any iron rule applied to all.”

The object of the Commissioners in making recommendations IX.—XI. was to bring the telegraph into complete use, as an auxiliary to operation throughout the railroad system of the State ;—to have, in fact, the telegraph a necessary and recognized part of railroad machinery, with the use of which every station-master and conductor must be familiar as a prerequisite to his holding his place. The expediency of this change, merely on the ground of economy to the corporations, was strikingly illustrated throughout the investigation which followed the Revere disaster. A very large proportion of the rolling stock of the Eastern railroad was rendered unavailable during the week ending the 26th of August, when it was most needed, because trains were standing still at points of passing, waiting for other trains which were out of time. The track was perfectly clear for miles, but no orders were received, the road was operated in the dark, and the wheels stood still to the equal loss and inconvenience of the public and the corporation. The systematic use of the telegraph can alone enable a company to get the greatest possible amount of work out of a given quantity of rolling stock, whether freight or passenger. Again, as regards the laying down of double tracks : this is a most costly expedient to accommodate an increasing business. The necessity of it is in many cases obviated by a thorough use of the telegraph. The Commissioners are not acquainted with a single double-track road in the United States west of Buffalo. There may be such, but they have never heard of them. Roads like the Chicago, Burlington & Quincy, the Michigan Central, etc., accommodate their vast traffic on a single track simply because

they make use of the telegraph, and yet experience has shown that these roads are as free from accidents as any double-track roads in Massachusetts. The Commissioners do not wish to be considered as saying anything to discourage the construction of double tracks—they are of course safer and more convenient than any single track can be;—all they desire to do is to call attention to the prodigious accuracy effected by those who have learned to thoroughly utilize the telegraph. That no Massachusetts road has ever yet done this was demonstrated by the single fact already mentioned, that in the rules of very few of the roads had any provision, even of the simplest nature, been made as to the effect of telegraphic orders, or the course to be pursued by employés in charge of trains on their receipt. The use of the telegraph without such cannot but be accompanied with danger. The Commissioners of course do not seek to convey the idea that no use has hitherto been made of the telegraph in operating Massachusetts railroads. On the contrary, all the companies, as a matter of course, make use of it more or less, and many of them make very general use of it; but at the same time the evidence in the Revere collision and the action of the committee of officials on the ninth, tenth and eleventh recommendations of the Commissioners make it clear that it is not in all quarters used either as much or as systematically as it well might be. The deficiency is most apparent as regards the movement of trains. Many of the roads of Massachusetts at the time of the Revere accident made use of appliances more or less crude and antiquated, such as semaphore signals, dials, sand-glasses and green flags to secure intervals of time between succeeding trains. All of these, however, have served their purpose and been abandoned elsewhere under the pressure of an increasing traffic necessitating a more rapid movement. It is in England that the system of telegraphic signals has been developed to the highest point of perfection, and some of the results attained there are very remarkable.

For several years past the utmost exertions of the English Board of Trade inspectors have been directed towards securing the general adoption on the railroads of Great Britain of what is known as the block system. The essence of this system lies in the substitution of an interval of space between following

trains instead of an interval of time.* Its operation is very simple. Where a road becomes crowded by a too rapid sequence of trains, telegraphic stations are established from point to point along the more busy portion of the road. The passing of a train by any given station is telegraphed back from that station to the preceding one, and no following train can pass this preceding station until the telegraph has notified such train of the fact that the intervening space is clear. In the case of the Revere accident, for instance, after the Beverly train left Chelsea the Portland express would have been unable to pass that station until the Beverly train was signalled as having left Revere. A description of this system as in use in England, will be found in Appendix H of this Report. Where it has been thoroughly adopted the roads have been comparatively free from collisions. The South-Eastern and the London, Chatham & Dover, for instance, operating four hundred and sixty-six miles, worked throughout on a telegraph block-system, met with no train accident in 1870; while the London & North-Western, worked for a small portion only of its fourteen hundred and seventy-seven miles on a block, had no less than

* "The principle of securing intervals of space in place of time intervals between trains, which has now become generally known as the *block-system*, is one improvement on which much has of late been said, and the extension of which the inspecting officers have had occasion constantly, and too much in vain, to recommend during many years. But it is not, of itself, a panacea for the prevention of railway collisions, nor is it even, as I shall have to show, the principal remedy required. It becomes valuable only where it is applied under good regulations, with suitable apparatus, in the hands of trustworthy servants, and with the aid of good discipline, especially as regards signal-men and engine-drivers. It requires, also, to be introduced, employed and properly maintained, in combination with sufficient accommodations,—sidings, and independent sidings or relief lines, for marshalling, shunting and generally disposing of goods trains out of the way of passenger traffic; with carefully adapted signal and point arrangements, including concentration of the levers and interlocking between them in proper signal cabins; with ample break-power in the trains; and with more stringent regulations in regard to reduction of speed, the observance of signals, and the greater use of detonating signals in foggy weather." *Report of Capt. Tyler*, p. 3.

The above extract conveys apparently a fair idea of the excessive precautions necessary to the safe operation of English railways. In speaking of the accidents upon them it is to be borne in mind that they are called upon to accommodate a traffic absolutely unknown in America. As, for instance, where two hundred and seventy regular trains of one line alone pass a given junction each twenty-four hours; or four hundred and sixty-nine trains both ways pass a single station daily, with a regular interval of five-eighths of a mile; or where one hundred and thirty-two trains enter and leave one station during three hours of each morning, and the same number during three hours of each evening, being one train for every eighty-two seconds.

thirty-four train accidents which required investigation during the same year.

No such system has as yet been introduced upon the Massachusetts roads; simply because their traffic is comparatively light, collisions are of rare occurrence and the necessities of an overwhelming business have not compelled the innovation. And yet in discussion with the Commissioners some of the experienced officials of the roads running out of Boston have not hesitated to assert that they did not think it would be possible to operate their roads on the block principle; the fact meanwhile being that more trains enter and leave the Cannon Street station in London each day through the aid of the block system than enter and leave all the stations in Boston combined. It has been estimated that an average of fifty thousand persons were, in 1869, daily brought into Boston and carried from it, on three hundred and eighty-five trains, while the South-Eastern railway of London received and dispatched in 1870, on an average, six hundred and fifty trains a day, between 6 A. M. and 12 P. M., carrying from thirty-five thousand to forty thousand persons, and this too without the occurrence of a single train accident during the entire year. On one single exceptional day eleven hundred and eleven trains carrying one hundred and forty-five thousand persons are said to have entered and left this station in the space of eighteen hours. Yet under the so-called pressure of increasing business certain of the roads leading out of Boston, unable to preserve a sufficient time interval between trains, are considering the costly remedy of a third track. The Commissioners are unable to see any equivalent advantage to be derived from such an outlay. A double track road, with good sidings, and supplemented by a thorough block and telegraph system, besides being easier to manage and less expensive, could apparently accommodate a far greater number of trains than a mere three-track road.

One only subject remains to be considered in connection with the causes of railroad accidents, and this was not discussed between the Commissioners and the committee of railroad officials, except in connection with rule 29 of the regulations. It is, however, a fact that the most distressing class of railroad accidents, as the Norwalk, the Des Jardines canal and the New Hamburg, occurs on bridges. There is reason to believe that

almost everywhere, in Europe* no less than this country, the increased weight of rolling stock and of modern traffic subjects our railroad bridges, especially where deteriorated by age, to a strain for which they were not originally intended. The Commissioners would again renew the recommendation concerning guard rails, or joists, contained in their last annual report.† There is reason to fear that the severe lesson of the Athol disaster has not in this respect borne its full fruit. In the coming spring the Commissioners propose to give especial attention to this important matter.

It only remains to consider what legislation, if any, in addition to that now on the statute book, the investigations of the Commissioners would seem to indicate is required to secure the greater safety of the travelling public. As has already been seen, the subjects of walking on track, grade-crossings, bridge-guards, brakes on freight cars, safety-switches, and car lighting, to which causes thirty-seven per cent. of all injuries returned have been attributable, are already provided for sufficiently. Certain other fruitful causes of accident, such as getting on or off cars in motion, falling from cars in motion, crossing track in front of locomotive, leaning from train in motion, derailments generally, crushing between cars in shifting and shackling, explosions, suicides, etc., including about fifty per cent. of the

* "Many railway iron bridges have been in use for a great number of years, and some of them were originally constructed with a view to lighter rolling stock than that of the present day. As these deteriorate from wear and tear, and from rust, they necessarily become weaker, and it is of the utmost importance that they should, under careful supervision, be supported, strengthened or renewed, before any risk of actual failure occurs." *Tyler*, pp. 5-6.

† "Did the roads make it a rule to lay down upon all bridges and the approaches thereto double or guard rails inside of each rail of the track, a locomotive or car, meeting some obstruction on the rails on one side, would have its wheels on the other side held between the track and the guard rail, and would thus move only straight forward and could not diverge in such a manner as to run off the stringers. Or, if above the stringers, good sound cross-ties were placed, not more than 1½ feet apart from centre to centre, and extending three or four feet outside the rails to an additional stringer, with a guard timber placed midway between the rails, the engine or car on leaving the rails would be supported by the cross-ties, and would be prevented by the guard timber in the middle from diverging so far as to strike the side of the bridge. As old and used-up iron would answer every purpose of guard rails, the cost of taking this precaution would be very slight to the corporations. It would constitute a great safeguard to the travelling public, and the loss entailed by one such accident as that at Athol would probably cover the expense of laying down guard rails on every bridge of the Commonwealth."—*Second Annual Report*, pp. 26-7. See also upon this point Mr. Hinckley's letter, App. G.

whole, relate to matters obviously beyond the reach of legislation. It is difficult to see how any law could be framed to prevent their recurrence. There remain only the matters which have been discussed, and made the subject of recommendations to the companies by the Commissioners. Enactments of more or less binding force might be passed in relation to train-brakes, car construction, car heating and lighting, tail-lights, signals, use of the telegraph, joists on bridges, and the uniforming of employés. As regards some of the less material of these, such as the lighting of cars, the use of more powerful tail-lights, joists on bridges, and the uniforming of employés, it would not be difficult to frame laws which might be effectually put in force. As regards other and more really important matters, such as car construction, train-brakes, and car heating, legislation would be of very doubtful expediency. The general adoption of any improvement in these respects can only be the work of time, involving very considerable changes, effected only at great expense, in all the rolling stock in use. Meanwhile new and improved appliances are continually offering themselves for trial, and any legislation which should tend to exclude such from use would probably work more harm than good. Finally, the law makes the corporations responsible, both civilly and criminally, for the careful operation of their roads ; it is, therefore, a question worthy of great consideration, whether, subjected as they are to this responsibility, they should be compelled by statute, on these important points, to adopt appliances in regard to the safety and efficiency of which they may entertain grave doubts. This last consideration applies with peculiar force to any legislation looking to a compulsory use of the most important of all the improvements suggested, the telegraph, and the system of block signals. In England the subject has been much more discussed than in this country, and the opinion of those most competent to judge, including the government officials, was decidedly adverse to legislation, and upon grounds which seem entitled to weight.* Much

* Upon this point Capt. Tyler says in his report (p. 38):—"The next question that naturally arises is, whether further interference, either by powers delegated to a government department, or by the more direct action of the legislature, is now desirable, and whether any measures of this description would tend to diminish the number of accidents on railways. * * *

"Looking to the various remedies, divided under fifteen heads, which were enum-

prominence was given, in the first place, to the question of responsibility already alluded to. The extreme injustice of the government assuming practical management, as regards essential details, and yet leaving the whole liability for disaster on the private corporations, was pointedly stated. The decisive objection, however, was found in the extreme and apparently insuperable difficulty which accompanies the framing of any legislation which shall be at once effective and yet elastic enough to meet all the conditions and requirements of a most

erated, it is obvious on a first glance that many of them might speedily be applied, wherever they are required, with great advantage; and that the sooner they were brought into practical operation the sooner, *pro tanto*, would the number of accidents diminish, and benefit result in respect of the comparative safety of railroad travelling. * * And there can be no doubt that for the immediate object of safety any pressure from without, by which the companies could be induced or compelled more rapidly to adopt remedies of this description, would so far be advantageous. But it must be remembered, on the other hand, that a railway requires daily and hourly supervision and repair, as regards its works, permanent way, rolling stock and other parts, as well as that many of the remedies enumerated have reference to care in design and construction of details; to maintenance, regulations and discipline; and to increase of conveniences in working, as from time to time they become required. Any interference which would tend to relieve the railway companies of such responsibility as now rests upon them, would have a mischievous rather than a beneficial tendency, as would also any system of interference which led to divided control; and any attempt at interference in the actual maintenance or working of railways must lead to a division of responsibility, as well as to a division of control. It is desirable, and even unavoidable, that improvements should, on any railway which is worked as a joint-stock concern, for the profit of shareholders, be introduced by, and under the auspices of those who are entrusted with its management; and especially in cases in which success depends upon care in construction, maintenance, and daily discipline. Either the government must take the management of railways into its own hands, in which case all the officers and servants of the railway companies would become officers and servants of the government, or it must leave the management to the companies. Direct interference with details of working, of management, of maintenance, or of increase from time to time of accommodation or appliances, would necessarily lead, as long as the companies are working for a profit, to constant complaint and recrimination. The shareholders would be discontented, and the public dissatisfied; the officers of the companies would point to government interference, and the government officers to company management, as causes of evil; and when an accident occurred the responsibility would lie between the two, and it would be the natural endeavor of each to shift it to the other."

To the same effect the Commissioners take the liberty of printing the following forcible extract from a private letter, addressed to one of their board by a prominent official of the Board of Trade, or Great Britain:—

"Any scheme for the purchase of the railroads by the government will have my warmest support when it comes. At present we are only pestered by constant demands that the government should interfere in all kinds of trivial details of management, by means of legislation, e. g.:—that that they should introduce a bill to compel companies to supply *foot-warmers*! My constant answer to these applications is that government is not afraid to work the railroads itself, but that it will not meddle with existing management, nor divide responsibility with it, nor endeavor to effect by legislation that which is beyond the province of legislation, namely, the settlement of administrative details."

complex system. A thorough system of block signals, for instance, would be absurdly unnecessary, if applied to all the railroads in the State, and would be calculated rather to increase than diminish the number of accidents. So, also, as regards telegraphic communication with all railroad stations. This the law could easily prescribe, but the use to be made of it in practice must still remain within the discretion of railroad officials. Its careless or unregulated use tends to increase the number of accidents, while to its enforced use, whether really complied with or not, every disaster would be attributed.

Finally, the only effect of additional legislation on the really important points which have been discussed, would be to impose additional criminal and civil liability in case of accidents the occurrence of which would obviously have been prevented by the use of certain appliances indicated in the statute. This liability would already seem to have been practically imposed on the corporations by the joint action of the committee of railroad officials and of this Board. The corporations can disregard the recommendations which have been made only at their own risk, and the occurrence of any accident clearly attributable to a disregard of those recommendations would, in presence of a jury, affect the interests of those responsible in a way not to be mistaken. The Commissioners have good reason to believe that the desired changes are now being effected with all reasonable rapidity throughout the Commonwealth. There is little danger that the lesson of the Revere disaster will be lost. Many corporations have already, within the last few months, extended the use of the telegraph, adopted improved train-brakes and signals, and taken other precautions. The extremely harmonious action of the committee of railroad officials with this Board, will unquestionably lend a great stimulus to this movement, and as it is now progressing the Commissioners feel warranted in expressing a confident hope that the close of another year will find the railroad system of Massachusetts, taken as a whole, as thoroughly provided with improved appliances and as well protected against danger of accident as are the more advanced members of the systems elsewhere.

PART III.

The last portion of the present Report the Commissioners propose to devote to the consideration of those questions of more general interest arising out of the material relations existing between the people of the Commonwealth and the several members of its railroad system; stating, as clearly and succinctly as they can, the reasons of their action during the past year, the ends they have had in view, the means they have adopted towards the attainment of those ends, and, finally, the course they propose to pursue, unless otherwise instructed, during the coming year.

A definite plan, both of investigation and of action, has been pursued by this Board since its first organization, as steadily as circumstances would permit. It was first sought, through a thorough analysis of the past and present industrial conditions of Massachusetts, to arrive at a clearly defined conception of the policy on the part of its railroad corporations which was best calculated to meet the needs and to promote the development of the State. This once established and accepted as correct, the methods through which the private corporations controlling the several members of the railroad system should be induced to adopt that policy, would be matter for ultimate discussion.

The first part of the work,—the analysis of the industrial condition and of the consequent requirements as regards transportation of the existing community of Massachusetts,—was a comparatively simple task, and one in which the conclusions arrived at admitted of little discussion. To this subject the larger portion of the first annual report of the Board was devoted. The relative importance to the community of its several leading branches of industry was found greatly to have altered since the construction of the railroad system was begun. While, as was indicated in the tables published in the first report, the products of the industry of Massachusetts had developed more than fourfold between the years 1845 and 1865, rising from an aggregate of \$125,000,000 in the first year to nearly \$520,000,000 according to the census of the last, a very great change was noticeable in the growth of the several industries contribut-

ing to this result. The original branches of industry from which the people of the State had accumulated the basis of their subsequent wealth, the fisheries and agriculture, had remained during the period referred to nearly stationary, the former contributing an increase in 1865 of less than \$50,000 over the amount returned from the same source in 1845, or less than the eightieth part of one per cent. of the total increase; while the relative importance of this industry to the entire industry of the State had, during the same period, decreased from 8.08 to 2.11 per cent. of the whole. During the same period the second source of prosperity, foreign commerce, had increased less than \$15,000,000, or 3.5 per cent. of the whole; while on the other hand manufacturing production in all its branches had undergone the amazing development of \$326,000,000, or 77 per cent. of the whole increase. These conclusions, drawn from a comparison of statistics, did but verify that which was matter of almost common notoriety, and which has been yet more strikingly revealed by the figures of the last United States census. It had long been matter of general observation that the farmers of New England were carrying on a most unequal struggle with those who cultivated the richer soils of the West, which the railroads were yearly bringing into more direct competition with them. All question which may have hitherto existed upon this point, has been removed by the recent investigations of the Bureau of Labor Statistics. The fisheries, also, except the inland, were in a stationary, if not languishing condition, and the recent national census has indicated that the fishing towns, save in certain exceptional cases, have experienced within the last ten years a decline in population. It is likewise a matter of equal notoriety that the whole foreign commerce of the State, once distributed among several thriving ports, has long since entirely concentrated at Boston, while even there it has for some years been in a languishing condition, from which it has but recently begun to revive. Meanwhile, within the twenty years referred to, the whole interior of the State had been revolutionized. Cities, towns and villages, devoted to almost innumerable branches of manufacturing industry, have sprung up in every direction, and are increasing with wonderful rapidity. The State is thus becoming one vast workshop sending the results of its labor all over the world.

Arguing from the result of this analysis it required but little reflection to decide upon the policy on the part of the railroad corporations, best calculated under these circumstances to promote the common interest. The case, indeed, hardly admitted of doubt. The future of every material interest of Massachusetts, whether of agriculture, of fisheries or of commerce, was clearly involved in the utmost possible development of her manufacturing industry. Could the State and the region of which it is the geographical and business centre be gradually developed into the recognized manufacturing centre,—the Belgium, in fact, of the North American continent,—there need no apprehension exist as to the continued prosperity of all collateral interests. The necessary demand existing in wealthy and populous manufacturing towns would create, and that alone could create, a reliable home market for every possible product of the soil or of the sea, and the immediate proximity of this market would enable the New England agriculturist or the New England fisherman to sustain himself in the work of production against the superior natural advantages enjoyed by others. A system of transportation, therefore, which tended to develop manufacturing industry, indirectly and not remotely stimulated every other branch of production. This solidarity of interest indicated with great precision the point upon which efforts should be concentrated.

Fortunately, also, as greatly simplifying the questions they were called upon to consider, at the very time the Commissioners began their labors one long-standing cause of difficulty and of popular complaint was permanently removed. The increased proportional cost of transporting agricultural products from the West to Boston over the cost to other points of shipment, combined with the failure of the railroad corporations to furnish either access to deep water or the most approved appliances, such as elevators, etc., to handle such produce when brought to Boston, had for years constituted a ground of complaint against certain of the principal railroad companies of the State. The whole foreign commerce of Massachusetts languished, also, for the reason that foreign vessels bringing cargoes into that port had been obliged to go elsewhere in search of a return freight; it had, indeed, become almost a custom for ships after discharging

at Boston, to go round to New York in ballast, there to procure outward cargoes. To such a length has this gone that in the year 1867 the outward bound Cunard steamers were withdrawn by their owners, and, for the first time since ocean steam navigation was an established success, Boston was threatened with a complete cessation of all direct steam communication with Liverpool and Europe. In their first annual report the Commissioners had the satisfaction of stating that arrangements had already then been perfected which made it very improbable that this evil would be of long continuance. The Grand Junction railway had some time previously passed into the hands of the Boston & Albany Railroad Co., and that corporation was then building an elevator at East Boston, and had made arrangements under which it was enabled to lay down consignments for actual shipment to foreign points at Boston, at the same rate from interior points at which they were laid down in New York.

The Commissioners then expressed a confident hope that these changes, and the known advantages of Boston as a place of export over New York in other respects, such as accuracy, promptness, etc., would constitute a sufficient inducement to Western shippers to export through this channel. In the two years which have since elapsed this hope has been fully realized. During the last railroad year only did the preparations referred to in 1870 fully develop their results, but during the autumn of 1871 outward-bound freights accumulated at Boston in excess of all means of transportation, and great quantities of breadstuffs, etc., have lain in the elevators and even in the cars upon the track awaiting opportunity for shipment. The accompanying table (Table No. 5) shows the course of grain shipment from the West to Boston during the last four years, and since the organization of this Board. It perfectly illustrates the rapid course of railroad development in this description of business. It will be noticed that while in 1868 about one-half of the barrels of flour and more than two-thirds of all other cereals which reached Boston reached it by sea, during the last year these proportions had decreased to one-third of the barrels of flour and one-seventh of the other cereals. The result of this change upon the commerce of Boston has been most encouraging; not only have the lines of

TABLE No. 5.

	FLOUR—BARRELS.				CORN—BUSHELS.			
	1868.	1869.	1870.	1871.	1868.	1869.	1870.	1871.
Boston & Albany Railroad,	646,684	728,846	864,380	802,365	376,868	1,031,322	760,713	1,674,201
Northern Railroad,	53,060	65,107	78,705	99,700	77,145	288,955	500,744	151,295
Fitchburg Railroad,	34,211	24,874	52,865	61,451	29,862	64,007	108,964	118,960
Grand Junction,	—	—	—	88,526	—	—	—	1,212,344
Total by railroad from West,	733,955	818,827	995,950	1,052,042	483,875	1,384,284	1,370,421	3,156,800
Boston & Maine Railroad,	16,515	18,238	17,534	14,784	1,574	896	5,129	3,298
Providence Railroad,	88,683	61,281	51,339	31,159	1,100	632	738	2,406
Old Colony & Newport Railway,	6,711	12,544	4,143	6,143	—	800	2,800	75
Portland Steamer,	53,992	40,284	19,787	30,126	2,695	—	7,086	2,212
New York Steamer,	307,812	271,635	288,946	281,135	68,921	2,356	5,812	23,192
Baltimore Steamer,	131,961	72,656	169,184	171,175	71,328	167,329	119,323	30,314
Philadelphia Steamer,	25,013	3,699	14,310	1,891	100,441	70,606	180,061	24,836
New Orleans Steamer,	15,213	6,952	—	—	205,701	17,231	—	80
Sail Vessels,	54,637	16,190	29,374	12,890	1,395,399	774,555	535,462	394,890
Other sources,	1,190	2,979	64,095	—	—	21,271	89,570	—
Total from seaboard,	701,727	506,458	658,714	569,303	1,847,159	1,055,676	945,981	481,303
Total from all sources,	1,435,682	1,325,285	1,651,664	1,601,345	2,331,034	2,439,960	2,316,402	3,638,103

TABLE No. 5—Continued.

	OATS—BUSHELS.				BARLEY—BUSHELS.			
	1868.	1869.	1870.	1871.	1868.	1869.	1870.	1871.
Boston & Albany Railroad,	418,062	721,128	1,001,233	1,675,970	728	12,999	15,970	29,669
Northern Railroad,	83,234	260,513	313,629	223,479	154,535	99,610	205,215	132,256
Fitchburg Railroad,	104,737	95,034	361,246	128,217	42,688	10,014	33,185	14,929
Grand Junction,	—	—	—	216,420	—	—	—	1,957
Total by railroad from West,	606,033	1,076,675	1,676,108	2,244,086	197,951	122,713	254,370	228,811
Boston & Maine Railroad,	55,600	3,109	77,337	1,778	25,135	26,005	16,753	747
Providence Railroad,	3,593	3,093	2,211	4,152	—	—	16,581	26,393
Old Colony & Newport Railway,	—	—	1,504	40	—	—	625	—
Portland Steamer,	1,298	352	62,893	6,537	4,020	13,370	21,875	9,351
New York Steamer,	49,481	10,840	2,840	1,028	—	16,414	6,661	8,228
Baltimore Steamer,	22,146	19,637	33,632	53,835	—	—	—	3,300
Philadelphia Steamer,	8,216	5,476	23,377	8,966	1,740	—	—	—
New Orleans Steamer,	6,138	—	—	40	—	—	—	—
Sail Vessels,	509,565	294,713	169,394	103,431	33,144	57,061	39,803	36,540
Other sources,	—	1,536	50,815	—	—	5,323	4,248	—
Total from seaboard,	656,037	338,756	423,853	179,807	64,039	118,173	106,536	84,559
Total from all sources,	1,262,270	1,415,431	2,099,961	2,423,893	261,990	240,886	360,916	313,370

ocean steamers been returned to the port, but the arrivals and clearances have largely increased, and while the imports have risen 27 per cent, the exports have increased in value no less than 57 per cent. Meanwhile the development in this direction is rapidly progressing. The Boston & Lowell, as the representative of the northern line of roads, is preparing for a large deep-water business on the Mystic flats; and the Fitchburg road is considering the propriety of making some arrangements for the reception of the increased business it anticipates upon the completion of the Hoosac Tunnel.

The exterior or through railroad business of the State cannot, therefore, but be considered as in a satisfactory and improving condition. So far as transportation is concerned the result desired in this respect may be considered as attained. This branch, however, of a foreign commerce, the export of the agricultural products of the West, however important it may be, interests but one city in the State, and but a comparatively small portion of the people. In their first report the Commissioners ventured the opinion that the material for a healthy and really profitable commerce for the people of Massachusetts would probably be found in the wants and products of their own workshops rather than elsewhere. An analysis of the elements entering into the largely increased money value of the imports at Boston during 1871 fully corroborates this proposition. The great staples of import are the raw materials of manufactures, — coal, cotton, logwood, hemp, hides, molasses, sugar, tobacco, indigo and wool. The importation of these staples depends on the demand which exists for them, and that demand depends wholly on the manufacturing development. No matter, therefore, from what standpoint of individual interest the investigation sets out it returns to the same conclusion: the development of her manufacturing industry is the first material interest of Massachusetts, and so much is it the first, that in the development of this industry is found to be included the development of all other industries.

Accepting this as a fundamental principle, therefore, the Commissioners had next to consider the policy on the part of the railroad companies which experience and common sense would indicate as that best calculated to supply the wants and stimulate the development of a manufacturing community. In

approaching this question, however, the Commissioners were obliged to keep the circumstances of the railroad companies carefully in mind. They could not proceed on the assumption that these corporations were mere public agencies, the interests of which might properly be sacrificed when a decided balance of public advantage would clearly result from so doing. The railroads, on the contrary, were the property of private companies to whom a franchise had been granted which devolved upon them certain public duties. They could not in justice be called upon to labor at a loss. However deeply, therefore, the members of this Board might be impressed with a sense of the public exigency calling for the adoption of a certain policy, they were obliged not to lose sight of the effect which the adoption of that policy would have upon those owning the railroads. Those who manage the railroads directly—the presidents and boards of directors—have two duties to perform, the one to their stockholders and the other to the community. They are essentially trustees; and in the first place they are the trustees of those who elected them to their offices. As such they would be bound, upon every principle of duty, to resist to the uttermost every attempt, whencesoever emanating to deprive those whom they immediately represent of that reasonable profit to which they are lawfully entitled. It is moreover of scarcely less importance to the community than to the body of immediate stockholders that every railroad should be amply remunerative. A poor, bankrupt, or even needy company almost as a necessary consequence has a road ill-equipped, unsafe and insufficiently operated; and, indeed, all such as a rule constitute a heavy drawback on the communities which they are supposed to serve. Any policy, therefore, the adoption of which the Commissioners might urge on the companies, would, if in practice it was found to unduly reduce net earnings, result as disastrously to the community as to the stock-holders.

In approaching the railroad officials with any proposed experiment in transportation, the Commissioners had, therefore, to be prepared to show them not only that such experiment in its result would greatly subserve the public interest, but they had further to satisfy them that it would also benefit, or would at least inflict no serious or permanent injury upon the railroad stockholders. To any adventurous or immature sug-

gestion of change the railroad officials would not only have been justified, but in duty would have been bound to reply, that as guardians they could not allow the property entrusted to their care to be gravely jeopardized for a possible public benefit; that stockholders were dependent upon dividends for the means of living, and that measures of reform which threatened seriously to curtail dividends should not be attempted by those managing private corporate properties in trust for others.

The Commissioners have here attempted to define their position on these points with all possible distinctness. They desire to do this for obvious reasons. Whenever they have attempted any step in advance as a result of their investigations they have been met with a statement of some of these elementary propositions put forward as if they were recent discoveries. It is very desirable that the discussion should make some progress, and to this end the Commissioners desire once for all to concede in the fullest manner both the training and experience of the railroad officials and their position as trustees;—on behalf of the community at large, as well as the stockholder class in particular, they equally recognize the inexpediency of any measure which would tend either to unduly decrease the reasonable returns on capital already invested in railroad enterprises, or to discourage further investments. These questions disposed of, and having definitely satisfied themselves as to the policy as regards railroad transportation which would most directly conduce to the industrial development of the Commonwealth, it remained for the Commissioners to suggest some method through which this policy could be carried into effect without serious curtailment of net profits.

Had the State itself owned or controlled any portion of the railroad system, so that it had found itself in a position to experiment at its own risk, the Commissioners would not have hesitated to recommend a trial of the bold policy of heavy reduction on all articles of raw material entering into manufactures, which some years ago was inaugurated in Belgium and there resulted in a brilliant success in which community and corporations shared equally. A similar success achieved at this time in Massachusetts would probably secure to the State for the next half century an established præminence among American manufacturing communities. Any such

course was, however, manifestly out of the question where all the railroads were controlled by private corporations. It only remained, therefore, to present at this time a general policy, and through a slow course of argument and public discussion to ultimately and by degrees effect its adoption. This general policy, which the Commissioners have during the last year urged upon the railroad corporations, was a very simple one, in no respect original with this Board.

It is a perfectly well-established fact in railroad economy that where a community is industrially in an elastic condition, ready at once to respond to any remission of burdens or improved appliances, a reduction of railroad charges within certain limits does not necessarily involve any loss of net profits to the corporations making it. The increase of business and consequent multiplication of reduced profits more than compensates for the smaller return from each transaction. But in effecting reductions and tariff reforms, the concessions which are to be made should not be distributed over too many objects, so that, through an excessive division, their influence may not be felt, but on the contrary, they should be concentrated on one or a few objects of general use, so that the interests effected may experience a considerable impetus, and thus, through the resulting development may not remotely return even more than was conceded. When, therefore, a railroad company, in response to a public demand for a reduction of rates, makes a trifling average reduction throughout its tariff, it does that which experience shows is apt to reduce its own receipts by the exact measure of the concession made, while it perceptibly benefits almost no one.

Had the industry of Massachusetts been devoted to the production of any one staple, the application of these principles would have been a comparatively easy task. This, however, is very far from being the case. Certain towns in the State do, indeed, devote themselves almost exclusively to particular industries, as Lowell and Lawrence to the manufacture of textile fabrics, and Lynn to that of boots and shoes; but other towns, such as Springfield and Worcester, have an extremely varied industry, and it is not easy to specify any one article directly entering into manufactured products, a cheap supply of which would be a common benefit. Everything in fact is needed, and everything

has to be brought from without the limits of the State. The greatest good of the greatest number in a manufacturing community was the general end towards which efforts had to be concentrated. A decision as to how this could most effectively be secured once arrived at, the Commissioners proposed to urge upon the corporations heavy and concentrated reductions on some one article specified ; or, in case under the peculiar conditions of the community which any corporation supplied, a reduction on this article was of minor importance, then an equally concentrated reduction on some other no less important item in transportation. Greatly reduced tariff charges for the carriage of coal appeared to the Commissioners, both in its practical importance and by way of illustration, the point towards which they could direct their efforts with the greatest assurance of success.

Next to the possession of a large body of skilled and intelligent citizens, the most essential element to the success of all manufacturing industry is the control of a cheap and reliable source of power with which to keep machinery in motion. This is enjoyed by New England only in the form of its mill-privileges, and these are subject not only to the three great drawbacks in the value of all water-power, ice, droughts and freshets, but as is now very generally known, this source of power is year by year diminishing. This is partly owing to the felling of forests, but much more to a superior cultivation which drains the swamps and low grounds which were formerly natural reservoirs. To such an extent has this process of shedding the water been carried that, not only is it estimated that the reliable power of valuable mill-privileges has been reduced forty per cent. but the freshets have so increased that twice within the last fifteen years it has been found necessary to elevate the bridges over such a river as the Connecticut. This change is still going on, and, with the increased population of the State, its influence will become more and more pronounced.

Meanwhile, though in itself and under the most favorable conditions water-power is unquestionably the cheapest of all means of operating machinery, it is yet mainly of use as a propelling force, and even where it is enjoyed in perfect abundance, a very considerable supply of fuel is also required in the com-

plicated processes of modern production. Next to food, shelter and clothing, fuel is also the greatest necessity of life. The inestimable value of a cheap and reliable supply of coal to a manufacturing community is singularly illustrated in the case of England. The annual production of the mines of that country has now reached the enormous amount of 120,000,000 tons, and Mr. Gladstone, then Chancellor of the Exchequer, in his Budget speech of 1866, in the House of Commons, did not hesitate to attribute to this fact the industrial prosperity of Great Britain. He then used the following language:—

“A race is going on between nations in industry and enterprise, and no doubt can exist on the question which nation is at this moment foremost in the race. The people of the United Kingdom are by far the foremost * * * We have undoubtedly got the start in the race, and it behooves us to inquire what special cause has given it to us; * * * the chief cause is the possession of our mineral treasures: the fact not merely of the possession of coal, but of the possession of vast stores of coal under such circumstances that we can raise it to the surface at a lower price than any other country in the world; * * * I think it is clear that at whatever time we may cease to be able to raise coal at a lower price than any countries, our relative position towards other nations must be seriously injured.” In a subsequent debate Mr. Vivian said: “It is utterly impossible to exaggerate the enormous importance of this question. The greatness and prosperity of England repose on her manufactures, and her manufactures repose on her coal.” To the same effect Mr. Liddell remarked: “It is a mere truism to say that the manufacturing supremacy of this country depends upon our retaining a cheap and abundant supply of coal,” and he added, “I do not regard the prospect of America being our competitor with alarm or envy, but I wish to point out that an advance in the price of coal will turn the scale in favor of that country.” These and similar expressions of opinions in the course of several lengthy debates were controverted by no one.

The Commissioners by no means wish to unduly magnify the importance of this question as an element in the industrial future of Massachusetts. The manufacture of iron, and especially of pig-iron calling for a great consumption of fuel, is a

far more important feature in the industry of England than in that of this Commonwealth. The people of Massachusetts have neither fuel nor ores of their own, and they consequently have turned their attention more particularly to those branches of manufactures in which skilled labor plays a much more important part than coal. In many branches of our industry they are well aware that the mere cost of power is but an insignificant item in the expense of production. Nevertheless, into all of them it does enter in some degree, and as such may undoubtedly be classed with food, and labor itself, as a prime element in our industrial future.

Accepting this, therefore, as that raw material, whether of industry or of comfort, which the community stood most in need of,—pressing it forward as a particular illustration of a general policy, the adoption of which they wished to urge,—the Commissioners have next sought to convince the several railroad corporations that the cheapest possible carriage of coal by them, amounting in fact to carriage at cost, was a matter in which they were no less materially interested than was the community itself. In the minds of the Commissioners this proposition almost admitted of demonstration. No railroad corporation can ever, for any length of time, succeed in separating its own interests from those of the community it serves,—the growth of that community is its growth, and any reasonable policy which will surely tend to the increased prosperity of that community cannot fail to redound to its own emolument. This elementary proposition no one will deny, so long as the statistics of Massachusetts show that every human being on the line of a railway yearly contributes to its treasury an average amount not less than seventeen dollars. An increase in population upon any line of railroad simply means an increase in the number of these tribute payers,—a gradual departure of population from its line to other localities more favorable to the exercise of their peculiar industries, means simply a reduction of its profits. The vastly greater portion of the railroads of Massachusetts were constructed to subserve the wants of interior regions. To all of the more important of these a cheap supply of all articles of raw material, and more especially of coal, is almost as the breath of life to their industry. It is from these fields that the railroad companies gather their harvest of dividends, and in

the successful production of that harvest, a cheap and reliable source of power is the prime essential. It is, in fact, to the manufacturer all that manure is to the agriculturist, and it has seemed to the Commissioners, and during the last year they have repeatedly urged it on railroad officials, that it was as bad economy for them to insist upon receiving large profits from the carriage of coal along the lines of their roads as it would be for a farmer to insist upon being handsomely paid for the cartage of every load of manure which he spread upon his fields. In the one case as in the other, the carrier should look for his reward in the increased production of his territory,—it is the crop he seeks for and not his pay as a carter.*

Very numerous and pointed illustrations could be cited in support of this view. The Commissioners have in discussion with officials of certain of the more important railroads of the State, gone so far as to maintain, though without urging upon any company the adoption of such a measure, that it would be not only a wise but a paying policy for any railroad corporation to hold out a standing proposition that it would for a space of five or more years transport without charge all the coal or other single article of raw material required for manufacturing purposes by any new manufacturing company which would establish itself upon the line of its road; the railroad in such cases looking to make good its losses in gratuitous carriage by increased receipts from travel, and for the carriage of all manufactured articles and articles of domestic consumption to and from a more populous and busy community. The Commissioners cannot cite any precedent in direct support of such a proposition, but they can cite one which comes very near to it. In 1869 a land company was organized at Wollaston, a station about six miles from Boston on the Old Colony & Newport rail-

* As this Report was passing through the press a singularly apt illustration of the correctness of the proposition here advanced was furnished on the high authority of the Philadelphia, Wilmington & Baltimore Railroad Co.

"This company encourages the cultivation of the Peninsula, by transporting manures at a slight advance upon cost, and by moving the fruit at high speed, in cars adapted to the business, mounted upon springs and trucks like those of passenger cars, and well ventilated; while charging for the service, rates which are very low, considering its character. The result has been a constant and large increase of the area devoted to the growth of peaches, strawberries and other fruits. And *** great profits have resulted to the fruit growers, encouraging them to invest more and more capital and labor each year in the cultivation of fruits and vegetables."—*Thirty-fourth Annual Report* (1871), p. 5.

way. In order to promote building at this place, and so increase their business at the station, the railroad company offered a free pass for three years to one person residing in any house which should be constructed there. At the time this offer was made, in 1869, the annual receipts of Wollaston station amounted to only \$2,099 per annum, received from 12,793 passengers. On the first of October, 1871, some seventy-five houses had been erected in the neighborhood, from which as many persons had a right to travel over the road to Boston on a free pass; yet at the same time the receipts to the road had risen to \$6,399 per annum, and the passengers to 48,270. (See Table, *ante*, p. 75.) The cost of a season ticket from Boston to Wollaston is sixty-four dollars per annum, and the free passes would therefore in this case represent an amount of travel for which the road would ordinarily receive \$4,700 a year. This sum had, therefore, in this case been temporarily sacrificed, representing the carriage of so much raw material,—coal, cotton, iron, or other article of prime necessity,—in order to secure at once the \$4,300, representing the usual and inevitable return from the consequent increased population on the line of the road, while, as passes expire, the \$4,700 per annum will also be secured in perpetuity.

Again, take the two cases of Lowell and of Fall River,—two of the leading cities of the Commonwealth, and competitors in the same branch of manufacturing industry. Both started in it many years ago, using water as the source of their motive-power. So far as cotton spinning was concerned Lowell was in the year 1865 largely in advance,—returning 385,412 spindles in the census of that year, while Fall River returned but 241,218. Shortly after that Fall River exhausted her water-power, and more recently Lowell has done the same. The progress of each place then came to depend upon the possibility of obtaining a cheap and reliable supply of new power. Fall River was situated upon the southern seaboard, while Lowell was twenty-six miles by rail removed from tide-water. The mills of Fall River, either now in operation or in course of construction contain 1,017,114 spindles; while Lowell numbers only 570,586.

The Commissioners by no means wish to be considered as expressing an opinion that it is to its more reliable and cheaper supply of coal alone that the recent remarkable development of

Fall River is due ;—it is probably attributable in at least an equal degree to other causes connected with the organization of its industry. At the same time they are led to believe that this proximity to the coal supply has been, and is, one essential point in its development, without which it would not have taken place. Meanwhile, the future of Lowell, whether it is to be a stationary or a progressive place, would seem to be wholly bound up in the question of an adequate and reliable supply of cheap power. Every considerable mill in that city has already been forced to have recourse, in a large degree, to auxiliary steam power, having already introduced into their works engines with an aggregate of 5,320 horse power, and consuming, in all the processes of manufacture some 41,000 tons of coal per annum. Upon the prompt and economical feeding of these engines the future growth of Lowell exclusively depends.

From among a very large number of communications on this subject, sent to the Commissioners from all parts of the State, a memorial received by them from certain of the manufacturers of Lowell has been selected for publication as sufficiently illustrating the proposition here advanced, and it will be found in Appendix D of this Report. To its statements and conclusions the Commissioners desire to call especial attention. As regards the facts upon which this memorial is founded, the Commissioners have already stated that they have not examined into them, and are not responsible for them. These, however, in no way affect the importance of the communication in its bearing on the general question. It will be noticed, in this case, that the alleged causes of complaint arise from demurrage, and the expense and inconvenience incident thereto, rather than from high rates of freight. At the same time, on the statement made by the manager of the company in another part of this Report, this last point would be worthy of consideration. Taking the facts as given in the communication from the manager of the Boston & Lowell road, printed in the first part of this Report (*ante* pp. 30-5), and examining them in the light of the returns of the company for the present year, it is not easy to see how less than two-thirds of the entire amount here charged for the carriage of this article of prime necessity can represent anything but profit to the railroad company. It is very true that the cost of power, as compared with labor and other raw materials, enters only

in a slight degree into the production of textile fabrics, having been estimated as low even as one per cent. The presence of a cheap and reliable source of motive-power caused Lowell, nevertheless, to be placed on the banks of the Merrimack ; and the exhaustion of that power, in spite of the start she has made, will, unless it be replaced by a new one, surely put a stop to her growth, and to the further increase of her annual contributions to the stockholders of the Boston & Lowell Railroad Company.

The case of Worcester, however, affords an even more striking illustration than Lowell of the extreme importance to the railroad corporations themselves of adopting some such discriminating policy as that here suggested. In the variety and remarkable success of its industries Worcester is, perhaps, as distinguished a monument as can anywhere be pointed out to the ingenuity and enterprise of New England. Crowded with manufactories, the successful operation of all of which depends, in some degree, upon power, this city has almost no source of power except such as is brought to it from without. Its annual consumption of coal amounts to at least 100,000 tons, and the heavy tax on power which the railroad companies centering at Worcester agree in levying, affords a good illustration of that policy against the continuance of which the Commissioners are contending. The strong case of the Washburn Iron Company was referred to at some length in the first annual report of this Board (p. 41). It there appeared that the amount paid by this company for carrying coal each year, in excess of the entire cost of such carriage, with a reasonable profit of fifteen per cent. added thereto, was some \$18,000. This power tax was equivalent to a municipal tax of about \$32 50 per thousand upon the assessed valuation of the company. An equally striking instance in point is furnished in the Washburn & Moen Manufacturing Company, also established at Worcester. This company probably does the most extensive business as makers of wire of all kinds, in the United States. They annually pay to the railroad corporations from \$60,000 to \$65,000 on the freight of raw materials alone. For power they are almost wholly dependent on coal, of which they use about 15,000 tons per annum, and this is brought to them over four roads at rates varying from 2.38 to 4.07 cents per ton per mile. The Com-

missioners are informed by the officers of this company that "the chief obstacle to a present increase in our business is the high rate of railroad transportation from the seaboard. We should be enabled to successfully compete with any manufacturing point in the United States could we have any considerable reduction in the cost of transporting raw material: our profits also would be largely increased, as our works are extensive, and fully equipped with improved machinery and facilities for doing much more than is now done."

Here, then, is a single establishment, the presence of which in Worcester involves the receipt of \$60,000 a year to the railroads centering there on the carriage of its raw materials alone. Indirectly, through the carriage of its manufactured products, the travel and incidental business which its operations involve, its annual railroad value would probably amount to at least twice that sum. It becomes of interest, therefore, to make some estimate of what it really costs the railroads to supply this source of their own profits with that raw material of power without which it must cease to exist.

Four seaboard railroads centre at Worcester, over all of which more or less coal is carried. These vary in length from 43 to 63 miles, and all charge what is practically the same rate. The longest route is from Boston; the shortest from Providence. The rates from the mine to Boston are, however, materially higher than to Providence, so that, in order to equalize matters and somewhat divide the business, while the 43 mile route charges \$1.75 per ton, the 63 mile route charges only \$1.50. Owing to the recent construction of certain competing roads, however, which have not yet had time to agree upon a combined tariff, the charge of \$1.75 per ton to Worcester is not insisted upon in the case of coal shipments to points beyond that place, and in such cases the roads have, during the last season, been eager to deliver coal at Worcester to connecting routes at \$1.25 per ton, though they were thus deprived of the use of their cars during the time required for the longer journey. They, in fact, tax their own local business in favor of more distant points.

In their report for 1870 (pp. 38-41), the Commissioners endeavored to arrive at some estimate of what would be a reasonable charge, on the part of the railroad corporation having the

shortest connection, for the carriage of coal from Providence to Worcester. Allowing 14 mills per ton per mile for haulage, 15 cents for the single terminal charge which devolved upon the company, and 15 per cent. for profit and contingencies, they expressed the opinion that a charge of \$1.10 per ton, in place of \$1.75, would amply secure the company from loss. Subsequent investigation has not enabled them to detect any error in these figures. On the contrary, estimates based upon other processes of reasoning are even less favorable to the corporation. According to the returns of 1870-1, the expense incurred by the Providence & Worcester R.R. Co. in moving freight during that year was \$1.52 per train mile. Allowing the expense of running coal trains to have been fully up to this average, and charging such trains with the double trip, as they are presumed to go up full and to return empty, the entire cost of such round trip would seem to be $\$1.52 \times 86 =$ to \$130.72. The usual load of a coal train is about 250 tons, which, at \$1.75 per ton, would seem to amount to \$437.50. Allowing the company, in addition to its regular train-mile expenses, which, however, include these items, 20 cents per ton for terminal charges at Providence, and 20 per cent. for contingencies and profit on the carriage of raw material, the entire charge per ton, based on their own returns, with large extra allowances, would seem to be 82 cents instead of \$1.10 as previously estimated by the Commissioners, or \$1.75 as actually charged by the company. The real cost of carriage on a full train, estimated on the company's returns, would seem to be 52 cents per ton.

In selecting the two cases of Worcester and Lowell for comment, the Commissioners do not desire to be understood as expressing any particular censure on the railroad companies which undertake to supply those two cities. They require examples to illustrate their meaning, and they take them wherever they find them. The various communications which have been made to them lead them to believe that other illustrations, equally effective, could easily be found; the Commonwealth abounds in them. As a general rule, every town of 30,000 inhabitants in Massachusetts consumes in the neighborhood of 100,000 tons of coal per annum; and this consumption increases or decreases in almost exact proportion with the rise or fall of

price. It is probably safe to say that 3,000,000 tons of coal are yearly brought from without into New England. This quantity is destined, with the growth of our industry, to be indefinitely increased.

The influence of this question on the increase and course of population in Massachusetts has not hitherto been fully appreciated. Fifty years ago, when the career of New England as a manufacturing community began, there was not a town in the State away from the seaboard of over 4,500 inhabitants: Worcester had 3000, Springfield 4000; Lowell and Lawrence had not been incorporated. Then took place the rise of the water-power towns, and the tide of population and of wealth flowed to the interior. Within the last few years, for the reasons already stated, this tide has again turned to the seaboard, as coal-power is found to be as cheap and more reliable than water, and Fall River, New Bedford and Salem are more accessible to the sources of supply than Worcester, Lowell or Chicopee. The next and final turn of this tide may now with tolerable certainty be foretold, depending as it does, upon a simple question of carriage.

The transportation of coal is comparatively a new question for New England, and one as yet but little understood. It is interesting in this connection to consider what is the probable difference in cost between the amount of coal now annually brought into New England at the mouth of the mine and in the hands of the consumer. During the present year, the price throughout New England may be roughly averaged at \$8 per ton; on the cars at the mouth of the mine the cost has been \$1.75. The difference between these two prices, \$6.25 on 3,000,000 tons, or \$18,750,000 may be taken as a fair approximation of the amount paid during 1871 to the transporters and middle men engaged in forwarding this one staple. Meanwhile the coal-fields are not more than 375 miles from Boston, and are perfectly accessible by all rail routes, which would obviate all breaking of bulk and demurrage as well as insure a reliable supply at every season of the year. Under these circumstances, it is wholly improbable that the present inconvenient and expensive method of supplying the commodity will long continue. Not only will all the interior towns of the State, at a very early day, receive their coal supply direct from the mines, and thus more

readily than from the sea-ports, but the Commissioners themselves entertain no doubt that Lowell, Boston and Providence will do the same. London, though much more accessible to the English mines by water than Boston is to those of Pennsylvania, has for years received the larger part of her coal direct by rail, and at rates per mile which would at present prices reduce the cost of coal in Boston to \$5.50 per ton. So great an advantage is land carriage in England obtaining over carriage by sea, that a direct line, to be wholly devoted to the carriage of coal, has recently been projected from the sea-board collieries of Newcastle to London, itself on tide-water. During the past year, a similar project for a narrow-gauge road, to be exclusively devoted to the carriage of coal, running from the mines of Pennsylvania to the centre of manufacturing New England, has been brought to the attention of members of this Board. The projectors of this enterprise were the owners of coal-fields, and proposed to build the railroad as an incident to the mining business, regarding it merely as a part of their machinery for getting the product of their mines to a market. The project was a bold one, and the Commissioners have no means of knowing whether it will be carried out. It is difficult, however, to see any reason why, if it were carried out, it should not prove a success. The consumption of coal in New England is limited only by its price. Now 3,000,000 tons a year, there is no reason, except cost, why it should not rapidly be increased to 6,000,000, and even 10,000,000 tons. A company which could afford, as was in this case claimed could be done, to lay coal down in Worcester at \$6.00 per ton at all seasons of the year, could almost from the start depend upon as large a business as that of the Reading railroad.

Meanwhile the all-rail movement of this staple will not depend on the carrying out of any such proposed undertaking. Within the last few months, for the first time, a direct connection of uniform gauge by rail has been effected between Boston and the mines of the Delaware & Hudson Canal Co., by way of Albany. There can be no doubt that at a very early day a traffic over this route will be developed which will successfully compete with the water transportation not only to the interior towns of the State, but as far as Boston.

In pressing their views upon this subject on the consideration of the railroad officials the Commissioners have frequently been met by an inquiry as to what they considered a reasonable rate per ton per mile for the carriage of coal. This question, in its general form, they are not prepared to answer; neither do they believe that a specific answer to it is possible except where every condition entering into the cost of transportation is first definitely established. Few things are more fallacious than the usual estimates made in answer to inquiries as to what it costs to move a ton of freight; yet the answer to the question of what is a reasonable charge for moving it, necessarily depends upon what it costs to move it. A given railroad company may by a system of averages arrive at some general results upon this subject, deduced from its individual experience, asserting that the cost is one, two, three or more cents per mile. When, however, this statement is generalized upon and made to cover the whole railroad system, creating, as it were, a standard of cost, the result is no less deceptive than it would be to argue as to the cost of raising a bushel of wheat or a barrel of potatoes from the experience of a single farm or a particular district of country. The cost of moving freights varies, under given circumstances, at least as much as the cost of raising crops. In the one case it depends upon soil, climate, cost of labor and the amount raised, with the appliances used for raising it; in the other upon the value of money, the cost of construction and operation, including wages, fuel and material; also upon the quantities seeking transportation, the regularity of its movement and the facilities for handling it. Take for instance a single item in the cost of movement from the accounts of the Boston & Albany and of the Pennsylvania railroads—that of fuel. In 1871 every ton of coal used by the Boston & Albany, cost the company \$8; during the same year it cost the Pennsylvania road, operating at the mouth of the pit, \$1.50 per ton: when, therefore, the cost of movement as deduced from the experience of the Pennsylvania road is accepted as generally correct and applied to the Boston & Albany a very considerable item of difference is lost sight of. The Commissioners do not, therefore, propose to commit themselves to any tariff on coal as now carried by the various roads which they believe would

in general terms be pronounced "reasonable";—in each case this must depend upon the peculiar circumstances of that case. A concession which one road could make with safety would bankrupt another, for there are roads in this State, young, poor, built in great degree to carry coal through an undeveloped country, which are in no condition to make any considerable concession. To all such, the remarks of the Commissioners are intended to apply only in a limited degree; other roads again run through populous manufacturing districts where each concession is felt almost at once in an increased production; it is to these last that the Commissioners have especially addressed themselves.

The principle of concentrated reduction is no less applicable however to fares than to freights. Hitherto it has in this State only been applied to short, local travel; it remains to be seen what effect it would have if the reduction were made under certain conditions, as it is in Europe, in the form of "return tickets," for greater distances and in proportion to distance traversed. In this case, for instance, persons residing at Pittsfield might be induced by more favorable terms to go to Boston over the Boston & Albany, rather than to New York over the Housatonic; in the other case, a concentrated reduction on short travel, especially in the neighborhood of trading centres, has tended to build up thick settlements along the lines of the roads. In regard to this last form of reduction more than one railroad official has met the suggestion of the Commissioners with an answer which strikes them as fallacious in the extreme. They have produced the returns of different stations on the lines of their roads, and have claimed that the commutation, or season-ticket business, for instance, was the least remunerative that they did, pointing to the small aggregate sum annually received for the daily transportation of large numbers of persons. In presenting the case in this aspect, they, however, seem wholly to ignore the fact that nearly every one of these commuters represents a family; that each member of this family not only travels constantly over the road at the regular rates of fare, but that the family is an integral part of a local community, every member of which has annually to pay the railroad company so much for transportation. The commuter

at low rates is to one class of stations what cheap coal is to another; no source of profit, perhaps even in itself a burden and a loss, but yet as stimulating a development which results in the demand for well nigh innumerable services from the corporation of a profitable nature, this burden is to the railroads only a necessary part of the outlay of their business. The case of Wollaston, already referred to on the Old Colony & Newport road, is an illustration in point. The policy of the road has been one element in leading to an increase of passenger traffic at this point from 12,793 in 1869 to 48,270 in 1871. The receipts from season-ticket passengers meanwhile, owing to the free-pass inducement held out to those building houses, increased only \$283.42 in these years, but the general receipts from other classes of travel increased from \$1,332.75 to \$5,349.74. Looking at the receipts from season tickets alone the corporation was rapidly losing money; looking at the receipts from those whom the season-ticket passengers brought in their train, the experiment was a singularly successful one.

Indeed, the only reductions in tariff charges which the Commissioners can now see their way to urge on the corporations, is the steady and tentative one which they have already indicated. Progress through this method is both safe and sure, the advance being made step by step. If, for instance, a cheapened supply of power stimulated industry to such an extent that the net receipts of any road increased instead of falling off, then the public might reasonably demand of such road another step in advance. This might be the concession of a drawback of a given proportion of the regular tariff charges in the case of all articles of raw material certified to be used for manufacturing purposes on the line of the road or of connecting roads. Such a system, moving forward only so fast as results reveal themselves, the Commissioners believe to be both progressive and conservative, affording ample protection to the interests both of the railroads and of the community, and this course they feel a confident hope has already been entered upon.

It now remains to consider the different methods through which the adoption of this or of any other systematic policy may be introduced into the railroad management of the State. This is by far the most difficult task which has devolved upon the Commissioners. Railroad officials are apt to receive with com-

placency, if not with indifference, abstract discussions of any system of railroad management differing from that to which they have been accustomed, so long as the proposed change is matter of discussion only; when, however, it becomes a question of actually accepting a policy suggested, the case changes greatly. The tolerably extended investigations of the Commissioners have disclosed three methods and three methods only, through which it might be attempted to impose upon the railroad corporations a fair trial of such a policy as they have suggested. These methods are,—

1. Through the agents of compulsory legislation, seeking to regulate fares and freights by statute enactments.

2. Through the influence of competition and example, by the operation of certain public or State roads side by side with roads in the hands of private corporations; and

3. By the results gradually but inevitably brought about in this country through the agency of an enlightened public opinion making itself felt by means of discussion and popular agitation.

It is now proposed briefly to discuss the results which may be expected to follow the persistent adoption of each of these several methods. That by legislation is the one most familiar to all countries living under a representative form of government, and it has been systematically pursued from the first inception of the railroad system down to the present day both in England and America, as well as to a certain degree on the Continent of Europe. The great obstacle in the way of its practical success has been the excessive, if not insurmountable difficulty found in regulating a most complex and delicate system, subject to all sorts of vicissitudes and requirements, by laws of general application. Where the acts passed were simple and easily understood, as the many acts which have been passed in almost all the States of the Union regulating fares and freights at so much per mile for each passenger and for each ton of freight, they have in practice been found to work results so unanticipated, and in many cases so unreasonable, that such acts have proved hardly more than dead letters on the statute book. Nowhere has this system been more persistently followed out than in Ohio. Rates have there repeatedly been established by law for the carriage both of persons and

of merchandise ;—the State commissioner on railroads and telegraphs in his last annual report expresses himself very distinctly on the practical operation of these laws. He says : “ There is not a railroad operated in the State, either under special charter or the general law, upon which the law regulating rates is not, in some way, violated, nearly every time a regular passenger, freight or mixed train passes over it.” He then proceeds to enumerate the laws and to point out the anomalies to which the enforcement of them must lead, and finally closes his comments with the remark that “ a strict enforcement of these provisions would compel some companies ultimately to suspend business, prohibit the transportation of certain articles by rail, or compel their transportation below actual cost.” (Annual Report 1870, pp. 6–8.)

The examination of the Commissioners into the practical operation of laws similar to those in force in Ohio in other States, has led them to believe that the experience of Ohio has not been exceptional. Simple and comprehensible laws have uniformly been found impracticable in application. Where, in order to avoid this difficulty, more complicated and discriminating statutes have been passed, the complexity of the system has uniformly, so far as the Commissioners are advised, caused the law when put in operation to break down under its own weight. Where special legislation has been resorted to, as has repeatedly been done in England, long tariffs and lists of charges covering all articles of merchandise transported by rail having been inserted in the charters of particular companies, it has been found that the development and necessities of trade have in practice, and even with common consent, nullified these provisions, which did not possess the flexibility absolutely requisite to the movements of modern commerce.

The only laws of this description, with which the Commissioners are familiar, which have practically been enforced, are those regulating by a fixed standard the carriage of persons by rail. Of this class are the English statutes which compel on certain lines the running of what are known as Parliamentary trains, and so called because run in accordance with Act of Parliament ; and in this country the laws prescribing rates of fare at so much per mile, the most familiar example of which is the two-cent rule on the New York Central railroad.

In the case of the Parliamentary trains the end in view was a simple one. There is in England a vast population which is very poor and which cannot afford in travelling to pay for a great rate of speed or for the best class of accommodation. The law was simply intended to compel the companies to provide certain slow and cheap trains at a low rate of fare for this poorer class of the community. This the law accomplished and this a similar law would accomplish in Massachusetts did a like exigency exist. In Massachusetts, however, there is yet no such well defined separation of the travelling community into various classes.

The familiar law in force on the New York Central is, however, of a different character and applies to all trains, descriptions of travel and rates of speed. No package, commutation or season ticket is sold at any reduced rate, and consequently the man who travels every day and by accommodation train pays exactly the same rate (2 cents) per mile, as he who travels once a year by express. When a similar law, applying to all roads in the Commonwealth paying more than eight per cent. dividends per annum, was proposed in the legislature of 1871, the discussion upon it elicited such unexpected results from the operation of such a law that the measure was rejected. For instance: though the bill was limited in its operation to roads paying annual dividends of eight per cent. and upwards, the effect of competition made it apply to other roads which either paid less dividends, or, in some cases, had never paid any dividend at all; practically threatening such roads with bankruptcy. Again, there is not a considerable business centre in the Commonwealth which is not surrounded by towns in which people have settled, built houses and effected every arrangement for residence, relying upon a regular and very cheap access by rail to their places of daily business. A law which substituted a uniform rate of two cents a mile for the commutation rates at which such persons travel would necessitate an entire change in their modes of life. Such a system might work well where a community has grown up under it; if, however, suddenly by act of legislature introduced into a community which has established itself under the discriminating tariffs always hitherto in use in Massachusetts, the Commissioners do not see how it could fail to produce most disastrous

results. How serious as regards regular season-ticket passengers such a change would be may be inferred from an examination of the tables accompanying the answers of the corporations to the Commissioners' circular of August 10th, *ante* pp. 25-85. From these it will be seen that those who travel most on the roads of this State, instead of paying two cents per mile, as is proposed, now pay but from $\frac{1}{4}$ cent to $1\frac{1}{2}$ cents per mile.

The rule of uniform mileage rate is also wholly opposed to the fundamental principle of taxation, that the burden should in all cases be so imposed as to rest most heavily where it will be least felt. The man who travels every day over a given route has a right, on every principle of economy, to buy his passage at wholesale rates, and to him a concession is a matter of great moment; whereas it is of comparatively little consequence what he pays, within reasonable limits, to the man who travels very rarely. A law, therefore, which imposes an additional cent per mile on the daily traveller to give it to the occasional one does not seem to place the burden of taxation where it is least felt. The Commissioners do not wish to express a decided opinion on a point which they have had no opportunity thoroughly to investigate, but they are nevertheless inclined to believe that the system of discriminating rates now generally in use on the Massachusetts roads is not only more profitable to the corporations than the uniform price per mile system of the New York road, but it at the same time is more advantageous to the travelling community through its practical adjustment of the burden.

An effort at another form of statute regulation of freights and fares has recently been made in Illinois, and the experiment is now upon trial. The several roads have been classified according to their gross earnings per mile, and tariffs of maximum charges have been framed and made applicable to each class of roads. It will be interesting to observe the results of this experiment, but the recent report of the State Commissioners holds out no encouragement in regard to it; it is difficult, also, to see how competition can fail to make the rates intended for roads of one class applicable in practice to roads of another. Such a system of classification must further prove a somewhat inflexible rule, as it admits of no discrimination in favor of the special requirements either of localities or of corporations.

The Boston & Providence railroad, for instance, and the Reading railroad may annually earn equal amounts per mile, so that upon this basis they would be classified together, but the first is a passenger and the second a coal road. To compel, however, the Boston & Providence to carry coal at Reading rates, or the Reading to carry passengers at the Boston & Providence rates, would not commend itself as a thoroughly matured measure of railroad reform.

The final difficulty with all legislation of this class is its excessively dangerous and politically corrupting tendency. It forces the corporations, whether they wish to come there or not, into the lobby of the legislature and the rooms of committees and commissions; they are forced there for the protection of their interests, for the essence of the system is that certain persons, whether the legislature itself or officials designated by the legislature, have devolved upon them the responsibility of establishing the revenue of property belonging to others. The Commissioners have grave doubts as to the success of any effort at the regulation of the railroad system which practically effects a separation between the ownership of a railroad and its management. Where the ownership of a railroad is, there both the safety of travellers and the certainty of traffic require that the responsibility of management should be also; and this consideration naturally suggests the question of State ownership of railroads.

2. In their second annual report (pp. 46-69), the Commissioners recommended the purchase by the State of the Fitchburg railroad with a view to its ultimate consolidation with the Troy & Greenfield road, including the Hoosac Tunnel, which is now the property of the State; thus making a connected line of road from Boston to the Hudson, to be managed in the public interest by trustees selected by the legislature, and affording a fair trial of the experiment of a public State railroad. The subject was carefully considered by the railroad committee of the last legislature, and their report upon it is contained in Leg. Doc's., 1871, Senate, No. 276. In view of the elaborate manner in which the subject was discussed a year ago, it does not seem necessary to encumber the present Report with anything more than a mere recapitulation of the argument.

The Commissioners took the ground that the experiment of cheap transportation was one of such vital consequence to Massachusetts that it ought unquestionably to be tried. It was, however, if thoroughly attempted, an experiment of doubtful issue which the officials of no private corporation would be justified in undertaking, except with the utmost caution, unless the State would guarantee their stockholders against loss. This of course could not be expected. The remarkable success which had attended the trial of similar experiments on the State railroads of Belgium, attracted the notice of the Commissioners and was described by them at some length in their report. They could see no reason why results of the same nature should not be arrived at through a similar process in Massachusetts; the industrial condition of the communities was certainly not unlike.

The real difficulty in the way of the experiment lay in the recognized fact that, as a rule, governments are notoriously less efficient than private parties as managers of any business undertaking. The necessary security against this, as the Commissioners believed, lay in carefully preserving the active competition between railways; not, however, as hitherto attempted between railways all in the hands of private corporations, but between roads owned and managed by government operating among and in direct competition with other roads owned and managed by private companies. In this division of management and the competition consequent upon it, and not in exclusive State ownership the Commissioners thought they discovered the secret of the success of the Belgian system. In support of this opinion they quoted the official statement of the minister having charge of the State roads of Belgium to the effect that the result of the system of mixed public and private ownership was that "the State railways find themselves placed in constant comparison with the railways worked by private companies; on the one hand stimulating them to general improvements, and on the other acting as a sort of check against any attempt to realize extravagant profits at the cost of the public." Mixed or competitive ownership and not exclusive State ownership was the essential principle of the experiment recommended by the Commissioners. The Commissioners saw no reason why such a system should not result in Massachusetts as it had in

Belgium. The State road running side by side and in direct contrast with the private road would be held up to the highest standard of management, or it would prove a speedy failure and be disposed of; meanwhile, in case the experiment proved a success the private corporations would find themselves compelled to adopt any successful reform introduced on the public road as a necessity of competition. Neither in this case could the private companies complain that the test to which they were subjected was an unfair one, upon the ground that profit was immaterial to the public road, as the public road would necessarily be obliged to earn enough to pay the whole interest on its cost (the equivalent of 10 per cent. dividends at least on the capital stock of any competing road), or, if it failed to do so, the people of other sections of the State would refuse to be taxed for the purpose of running for a local benefit an unprofitable railroad.

The object the Commissioners had in view in making the recommendation as regards the Fitchburg railroad contained in their last report, was to bring this important part of the discussion in which they were engaged prominently and as a definite proposition before the public. This accomplished, they have no further duty to perform. In making their recommendation of a year ago the Commissioners called attention to the fact that it is their province to deal exclusively with material considerations and it is for others to weigh political objections. They used the following language upon this point: "There are also very grave political considerations involved. The principle upon which our government is founded—that of least possible governmental interference and largest possible individual development—has a strong hold on the popular mind. The public opinion of the Commonwealth unquestionably accepts with great reluctance any measure calculated to bring industrial enterprises within the influence of politics. * * * The political considerations involved do not however fall within the province of this Board; it is for the Commissioners simply to recommend that course which is, in their opinion, best calculated to certainly and safely reduce the transportation tax; and it is for the people and their direct representatives to decide whether the advantages likely to flow from that policy are or are not counterbalanced by the dangers to our political system

involved in it. The problem before the Commissioners is a purely material one, and it is for another tribunal to weigh ulterior and political considerations." (Report 1870, pp. 60-1.)

It would, of course, be extremely impolitic for the Commonwealth to hurry into so costly and complex an experiment as the purchase of even a minor line of railway, before public opinion has fully and calmly settled down into a conviction of both the necessity and the propriety of such a measure. However clear the minds of the Commissioners may be on this subject, they are fully aware that it is still a novelty in the minds of many; it is no part of their duty to in any way attempt to precipitate a decision on any point connected with this railroad question; whatever is done should be done only after full discussion and a thorough sifting of arguments. As regards this matter of the State ownership of some line of railway, having sufficiently set forth the line of reasoning and the precedents which led them to make the recommendation contained in the previous report, there is no apparent reason why they should now devote further space to the subject.

3. It now only remains to consider the last of the three modes suggested, through which it might be hoped that any public policy could be engrafted on a private railroad system;—through the results gradually but inevitably brought about in this country by the force of public opinion making itself felt through discussion and the recognized official channels.

The Commissioners are not prepared to say that this may not be a remedy adequate to every present emergency, and the results of their labors during the last year would seem, they believe, to go far towards warranting such a conclusion. It must be remembered that Massachusetts was never so prosperous as now;—and while there is good reason to believe that a more public-spirited management of certain of our railroads would greatly tend to stimulate that prosperity, yet time must be allowed for such a management to develop itself, and it is only within the last two years that these questions have been systematically investigated. Public opinion as yet has had no sufficient time in which thoroughly to inform itself, and to concentrate upon some definite statement of what is demanded. To ascertain this demand, and to formulate it, has always been held by this Commission to be the most important of its func-

tions. When this shall have once been fully accomplished there can be little doubt that the companies will make every reasonable concession. In many respects, particularly as compared with some other States of the Union, Massachusetts is very fortunate in those who control her individual railroad corporations. They are, almost without exception, men of standing and character. The relations of the Commissioners with these officers have hitherto been very harmonious, and every recommendation which they have made has received a consideration at least respectful and fair. It shall be no fault of the Commissioners if these relations do not continue to exist. They certainly have no disposition to interfere, any further than a faithful construction of the laws under which they act shall compel them to, in the minor details of railroad management. If this Board is to fulfil its mission, it must be through its successful dealing with general questions in a large spirit of the public service, and it can only waste its strength by inviting struggles on matters of lesser consequence. Neither as regards the larger issues would it be reasonable to expect that officials of great experience and high standing in their profession should implicitly accept every suggestion emanating from a Board of comparatively recent creation, and whose position can only be established through the gradual results of its labors. Up to the present time, however, the Commissioners have seen no good cause for discouragement. They believe that they have already succeeded in establishing a public policy which meets with popular acceptance, and this policy has already been sufficiently adopted by the railroad corporations to insure for it a trial of moderate fairness. Should it succeed under present conditions, and should public opinion demand a further extension of this policy, it will doubtless be conceded. In America the force of public opinion is well-nigh irresistible, and the experience of the Commissioners has convinced them of the fact that railroad officials as a rule are peculiarly sensitive to it. It is only necessary to convince them that it is aroused and that it will not die out. For this reason, if the people of Massachusetts are now laboring under any grave inconveniences of railroad management the Commissioners feel constrained to say that the people are themselves mainly responsible for them. It is not easy for those who have not

had personal experience to understand the difficulty which a public official, such as a member of this Board, meets with in getting any cause of complaint presented in such a tangible form that he can base any action or representations upon it. Manufacturers, men of business and travellers stop them in the streets and enter into angry complaints, or they write letters presenting detached facts requiring further investigation. In the vast majority of cases the matter ends here. No effort of the official will bring forth any evidence on which action can be based. The complainant is either busy and will not afford the time to make his grievance specific, or, where the difficulty is a radical one, he rather prefers to bear it than to undergo the trouble and inconvenience necessary to remedy it. Yet no case has yet come before this Commission and been regularly examined into and brought to the notice of a railroad corporation, with a distinct recommendation of a remedy, that a sufficient measure of relief has not in consequence been conceded.

The Commissioners have endeavored in this report clearly to indicate their opinions upon every subject which has presented itself. They are fully sensible, however, that it is the legislature which must either approve the course hitherto pursued, or indicate such other course as may better commend itself to its judgment. In any case, whatever policy is indicated will receive the active support of this Board, with a view to giving it a fair and unprejudiced trial. Meanwhile, should no intimation of a desire to enter upon some other line of action be given, the Commissioners propose during the coming year to follow up as energetically as they may that policy which has been developed in the course of this Report. They propose carefully to observe the results of the experiments which have already been initiated, and to keep the public and the several corporations fully informed as regards them. Should they result in a success, it may fairly be hoped that progress in the same direction will in the future be much more rapid, and that it will in the end be found that both the Massachusetts community and the Massachusetts railroad corporations have entered upon a period of greatly increased prosperity.

In bringing this Report to a close, the Commissioners feel that some explanation is due to the Legislature, both of its excessive

length, and of their delay in submitting it. So far as its length is concerned, it is to be remembered that during the last year only has it been possible for this Board to get fairly in operation. As a consequence of this fact, and of the occurrence of the Revere disaster, a most unusual amount of ground had to be gone over. This work has been performed, and the results will constitute the necessary basis of future labors.

So far as the delay in submitting the Report is concerned, it will be noticed that it consists properly not of one, but of three distinct reports, each of them believed to be necessary and each of them in their preparation requiring no inconsiderable expenditure of labor. While this work has been accomplished, with a vacancy existing in the Board, and with no inconsiderable amount of regular business to dispose of, the returns have also been remodelled and rules for operating the roads of the State prepared. This explanation of their delay, the Commissioners hope will not be unsatisfactory.

Meanwhile it is not probable that these circumstances will again recur.

J. C. CONVERSE,
CHAS. F. ADAMS, JR.,
A. D. BRIGGS,
Commissioners.

A P P E N D I X .

[A.]

REPORTS UPON RECENTLY CONSTRUCTED RAILROADS.

ATHOL & ENFIELD RAILROAD.

[Incorporated (Swift River R. R.) Acts 1851, chap. 314; 1853, chap. 361; (Athol & Enfield R. R.) 1869, chap. 174. See also Acts 1869, chap. 315, 404; 1870, chap. 296; 1871, chap. 289.]

This road constitutes a link in a projected through route running direct from Springfield, on the Connecticut River, to Concord, N. H.; connecting at the former point with the New York & New Haven road, and at the latter with the northern New Hampshire railroad system. Two short links in the line only now remain to be constructed,—that between Springfield and Enfield, about twenty miles, at one end, and that between Athol and Winchendon, upon the Cheshire road, upon the other. No charter at present exists for the construction of either of these pieces of road. As now completed and in operation, the Athol & Enfield road connects with the Vermont & Massachusetts at Athol, and with the New London Northern in the northern part of the town of Palmer, passing through the towns of Dana, New Salem, Petersham, Greenwich and Enfield. The road is constructed through a rough, wooded and farming country of a very broken and uneven character, and sparsely populated; shortly after leaving Athol, and climbing by easy grades the divide between the Miller and Swift Rivers, it strikes the ponds which are the source of the latter, the course of which it closely follows.

The grades of the road are easy, but, like all the roads recently constructed in Massachusetts, it has been built with a strict eye to economy, and is consequently much less straight than it otherwise would be. It is indeed a remarkable evidence of contractors' skill that a railroad could have been constructed through so broken a region, so large a portion of which was a mere surface road. At the time the Commissioners passed over it the ties for several not inconsiderable portions of the line had been laid down directly on the turf or upon a thin bed constructed of loam thrown in from the

sides. Considerable future expenditure for proper ballasting will consequently be found necessary. The rails are new and of English make, weighing fifty pounds to the yard, and twenty-four feet in length. The road is well equipped with solid chestnut ties, 2,300 to the mile, and procured along the line at a cost of about forty cents each. The rails are secured to these by the full quantity of spikes, and their ends, with the exception of about one mile of road which is fish-jointed, rest upon the ordinary crab-chairs. The switches are equipped with the Tyler guards for the main track, with the exception of six, which the Commissioners requested the company immediately to remove in accordance with the provisions of chap. 24, of the Acts of 1871. Any switch upon the road other than the safety switch renders the corporation liable to the penalties provided in this Act. All the public-way crossings upon the road are at grade, and at the time the Commissioners passed over it, were unprovided with cattle-guards,—an omission rendering the company further liable to the penalties prescribed in Gen. Statutes, chap. 63, sections 43-4. The bridges and trestle-work were of good pattern and apparently well constructed. The stations averaged one in three miles of road, and were extremely well adapted for the business they were expected to accommodate. Although a single-track road, no telegraphic facilities had been provided at the time the Commissioners went over it; the attention of the directors was called to the extreme importance of this omission, and they stated that an arrangement had already been effected with the Western Union Telegraph Co., under which it was intended to have telegraph communication with each station on the line. Meanwhile, for the present, no two trains need ever be on the road at the same time, unless one is a special. The whole cost of the road has been about \$20,000 per mile. Its stock is held, one-half by the contractor, and the remainder about equally between the towns and individuals along the line.

The road cannot be said to be either well or thoroughly built, nor could it sustain any considerable traffic and continue safe. This, however, it is not likely to have, and it is sufficiently well constructed for all practical purposes. For the present and for some time to come the business this road expects to receive must be very limited, and such as would not have justified the construction of a first-class railroad. It will carry out large quantities of wood—chestnut, oak and pine—from along its line, as well as manufactured articles from the various establishments on Swift River. These are now ten in number, and represent the usual New England variety of product; there are duck, woollen and paper mills, a saw-mill, a man-

ufactory of furniture, and also one of piano and billiard table legs; further back from the road and among the hills are numerous mill-privileges from which a large supply of lumber is anticipated. On the other hand, the chief articles to be brought into this region will be coal, merchandise for general consumption, and the various raw materials consumed in the factories.

The road was evidently much needed and will be of great service to the district through which it runs; it was, in fact, necessary, to save it from the danger of depopulation. The recent construction of this and of other similar roads is to the Commissioners an unanswerable argument in favor of the policy of allowing towns, under reasonable restrictions, to subscribe to the stock of new railroads. The roads are absolutely necessary, not merely to the prosperity, but to the continued existence of the communities. When prudently managed, also, these roads are found to be a source of reasonable profit to their owners. There can be hardly a question that, though much remains to be done upon it and a considerable amount must yet be expended in construction, the Athol & Enfield will prove no exception to the rule.

BOSTON, BARRE AND GARDNER RAILROAD.

[Examined December 6th, 1871.]

This road was originally chartered as the "Barre and Worcester Railroad" by chap. 276, Acts of 1847, and amended in chap. 106 of 1848. It took its present name by chap. 55, in 1849, and has had additional legislation in chap. 63 of 1851, chap. 336 of 1853, chap. 114 of 1856, chap. 93 of 1857, chap. 97 of 1859, chap. 84 of 1863, chap. 18 of 1865, chap. 30 of 1868, chap. 69 of 1870, and chaps. 343 and 395 of 1871.

It is now built from Worcester to Gardner, and was opened for travel in November, and three passenger trains and one mixed train for passengers and freight are daily run each way over its whole length of $23\frac{3}{8}$ miles. It passes through portions of Worcester, Holden, Princeton, Hubbardston and Gardner. The summit from which water is shed easterly into the Nashua River, and westerly into Ware River, is passed at a point a little westerly of Princeton station, sixteen miles from Worcester. At Holden there are important manufacturing establishments of cotton and wool, and at Gardner, large and extensive chair factories. The balance of the route is generally through an agricultural section, hilly and

uneven in character. The early setting in of winter has prevented the completion of the road at some points, but so far as it is done, the work is creditable to the company. Some of the embankments need widening, and some of the excavations to be widened, sloped and ditched, all of which will receive attention as soon as the frost is out of the ground next spring.

The ties are mostly chestnut, of good size and quality, placed about $2\frac{1}{2}$ feet apart, c. to c., or 2,200 per mile. The rails are of the "Crawshaw" brand, $3\frac{1}{2}$ inches high, $3\frac{3}{4}$ inches base, weighing 56 lbs. per lin. yard, and mostly in lengths of 24 feet. The switches are of the "Tyler," and the "frogs," of the Mansfield patent.

The bridges are of short spans, there being none of more than 30 feet, and are all of stone or wrought-iron, there being eight trussed girders of the latter material, and three arch bridges from 12 to 20 feet span of stone.

The maximum reported grades going easterly, are 45 feet per mile, and going westerly, 60 feet per mile, and the curves are all five degrees or less. The turnouts or sidings appear of ample length for present business, and the station buildings *between* Worcester and Gardner, though not large, are sufficiently so. The passenger houses are models of convenience, and in their arrangements, the fact that *men* have rights, which this road at least, is willing to respect, is unequivocally admitted. Provision has been made for an ample supply of water by reservoirs and aqueducts at all the stations. The fencing of the road is mostly of iron wire network, with chestnut posts, though some of it is of posts and boarding, and some of stone wall. The omission to build effective cattle-guards at the grade crossings of highways, with fences from them to the land lines was observed, and the officers of the road were notified in regard thereto. Most of the highway crossings upon this road are at grade, there being upon the line thirty at grade, two where the highway is carried over, and one where it is carried under the railroad. In this respect, although built under the direction of the county commissioners, the Railroad Commissioners believe that a great mistake has been made, especially as at several points an inconsiderable amount of money expended in changing the line of highway for short distances would have allowed crossings to be built over or under the railroad at moderate cost and easy grades. In approaching Worcester at a point about $2\frac{5}{8}$ miles from the Foster Street station, this road connects with and enters the city upon the tracks of the Worcester and Nashua railroad, and uses the station buildings of that road for the trans-

action of its Worcester business, and will probably continue to do so until the question of the Union Depot is settled.

At Gardner, the connection with the Vermont and Massachusetts railroad is inconvenient and inadequate, and proper regard for the wants of the travelling and business community, require better facilities for the exchange of passengers and freight at that place.

The total cost of the road and equipment to date, has been \$616,196, an average of about \$26,355 per mile for the $23\frac{3}{8}$ miles constructed.

In one respect this corporation can in its practical operations, and in its effects upon the district it was built to accommodate, hardly fail to be a most interesting subject of observation. Built by the towns through which it runs, and a controlling interest in its stock owned by these towns in their corporate capacity, the management of the road should afford on a small scale an illustration of the results of public railroad ownership. This road was designed to supply a public want, and was not undertaken as in itself a profitable investment. The towns built it very much as they would build a highway. It is understood that they now propose to operate it, not as a feeder to some trunk line, nor with a view to dividends on its stock, but in that manner best calculated in their view to promote the general prosperity of those who built it. Its future history should, therefore, throw a good deal of light on one of the most interesting questions of the day. Certain towns, as such, have here undertaken to themselves control their transportation by rail. If the experiment of the State ownership and management of railroads is ever to be tried, a preliminary experiment of its feasibility could not perhaps be made either more safely or under more favorable conditions.

THE DUXBURY AND COHASSET RAILROAD CO.

[Incorporated 1861, chap. 147; 1867, chap. 65. See also Acts 1868, chap. 340; 1870, chap. 47; 1871, chap. 104.]

This road was formally opened for traffic to South Duxbury, on the 21st of August, 1871. It was visited and examined by the Commissioners on the 15th of September. It is an extension of the South Shore road from its terminus at Cohasset to the town of Duxbury. It is constructed along the seashore of Plymouth County, through the towns of Cohasset, Scituate, Marshfield and Duxbury; it runs through a somewhat rough agricultural region of

rolling uplands, interspersed with salt marshes. The entire length of the road is 17.50 miles, and its total cost was \$310,407.57, or \$16,640.43 per mile. It is therefore probably as economically constructed a road as has ever been built in Massachusetts. Economy has, in fact, in some respects, been more rigidly kept in view than is perhaps wholly consistent with a true policy. There are, for instance, grades for short distances of 796 feet to the mile. This fact necessarily entails the use of locomotives sufficiently heavy to surmount these grades with the largest trains the road is likely to have occasion to use. Accordingly the entire length of a neighborhood road, built to accommodate the lightest of traffic, must be permanently crushed by the heaviest class of ordinary locomotives, because a sufficient sum was not at the outset expended at a few points to make the track reasonably level. The road, however, apart from the possible cost entailed in its operation, which concerns only the company, is sufficiently well built for the light business it is designed to accommodate. The rails are partly new and partly those removed from the Old Colony & Newport Railway to give place to steel, weighing 56 to 60 lbs. to the yard, fish-jointed and well spiked down to cedar and hemlock ties, numbering 2,000 to the mile. Its bridges, of which there are several, are of pile trestle-work, well built and equipped with draws. The sidings, etc., are supplied with the Tyler switch, in accordance with statute requirement. The stations are 11 in number, being one to $1\frac{1}{2}$ miles; they are well built and sufficiently commodious for present purposes. Upon this road as upon almost all others now constructed in this Commonwealth, every highway crossing is at grade. Upon this subject the Commissioners have sufficiently expressed their opinions. Highway crossings at grade are a most fruitful source of railroad accident, but their continued construction would seem to be inevitable as long as both citizens and railroad companies prefer them.

This road is intended to accommodate mainly a passenger travel, not only enabling the people along its line to communicate readily with Boston, but opening up for summer residence several miles of sea-coast hitherto comparatively inaccessible. There is but little freight traffic to be expected upon it, as the country through which it runs has no industries at present, other than fishing and agriculture. This road, however, can hardly fail greatly to enhance the value of all real estate in its vicinity. Owing to the rapid filling up of the interior States of the country and the accumulation of wealth, the seaboard of New England enjoys a species of monopoly of the most valuable description. Every year both the desire and the ability of a large class of those living in the inland cities to

pass a portion of the summer on the coast become more decided. In consequences of this it needs but a railroad to bring any sea-board town into a place of great resort. This has already been the experience in a striking degree of the towns along the Duxbury and Cohasset road.

The stock of this company is owned entirely by four corporate bodies, none of it being in private hands. The towns of Duxbury, Marshfield and Scituate, each hold 750 shares, and the Old Colony & Newport Railway owns 1,250 shares. The control of the road is therefore held by the towns along its line. Its future policy and management will be an interesting matter for observation, as all the parties in control must apparently be actuated by motives of self-interest different from those which usually control railroad directors. Their interest is indirect; their object in constructing will be attained, not by making the road directly profitable as an investment, but by making it enhance the value of other property already belonging to them. The South Shore and the Old Colony & Newport Railroad Companies regard it as a feeder to their own lines; the several towns owning the remainder of the stock, regard it as a public improvement enhancing the value of real estate. The future history of this enterprise may, therefore, not improbably furnish some means of forming a reliable opinion as to the effect both upon the prosperity of a company and of a community whose railroad is designed and operated not so much to make large dividends on its stock as to build up the largest possible business in the region it traverses.

FRAMINGHAM & LOWELL RAILROAD.

This road was incorporated, by chap. 113 of the Acts of 1870, to run "from some convenient point on the Boston, Clinton & Fitchburg Railroad, in the town of Framingham, thence by some convenient route through the towns of Framingham, Sudbury, Concord, Acton, Carlisle, Westford, and Chelmsford, to some convenient point in the city of Lowell," &c.

It had also subsequent legislation by chap. 241 and chap. 246 of 1870, and by chap. 33 of 1871. The road as built commences at Framingham on the line of the Boston, Clinton & Framingham Railroad, about two miles from the South Framingham station on the Boston & Albany Railroad. It is an important link in the new chain of railroads between Maine, New Hampshire and North-eastern Massachusetts, on the north, and Rhode Island, Connecticut

and tide-water on the south. It is twenty-six miles long and cost to October 1st, 1871, \$797,683.07, or \$28,803 per mile between termini. It has a total length of siding or turnout of about one mile, for the most part consisting of spur tracks with but one connection with main tracks. It crosses the Fitchburg Railroad "at grade" at West Concord, about one and a half miles westerly of Concord station. The crossing is made at nearly right angles, but there is a Y connecting track for transferring freight and other cars from one road to the other. The road was opened for public travel October 16th, 1871, but can hardly be called a *completed road*.

The early setting in of winter has prevented the widening of some of the excavations and embankments, which are too narrow for economy of operating, or the highest degree of safety of the travelling public.

The ties are of good quality, and sufficient in quantity, about 2,400 being laid to the mile. The rails are of iron, weighing from 50 to 56 lbs. per lineal yard, and mostly of the "G. W. M. AVON" brand, in length of either 21 or 24 feet and laid with wrought-iron chairs of the "Crab" pattern. A short portion of the northerly end of the road is laid with "fish-plate joints."

The law in regard to "safety switches," chap. 24, of 1871, has not been fully observed, as most of the switches are of the ordinary kind, though a few of the Tyler switches have been laid. The Commissioners have notified the railroad company of this omission. The heaviest grades are reported as 45 ft. per mile, and the sharpest curve as of 1,910 ft. radius. There are no cattle-guards at highway crossings (of which there are thirty-seven on the line, and "at grade"), nor fences from the side lines towards the tracks, to prevent the entrance of cattle upon the road, to which the attention of the company has been called.

The fencing of the line is light, but probably equal to the usual division fences of the adjoining lands. There is only one "Truss Bridge" upon the line, and that of about 100 feet span over the Assabet River.

The road runs through a sandy section of country, and no rock excavations were required in its construction.

Its terminal and intermediate connections are good and convenient, being as before stated at the southerly end, at the Fitchburg Railroad crossing, and at Lowell. The last is made by working upon and connecting with the tracks of the Boston & Lowell Railroad, about one mile from the Lowell station.

Four passenger and one freight train pass over the whole length of the road each way daily. The road has been leased to the Boston,

Clinton & Fitchburg Railroad Company for a long term of years, subject to confirmation by the legislature, the rental being understood to be thirty per cent. of the gross earnings upon the line.

A line of telegraph is now being constructed from Framingham to Lowell on the line of this road.

THE GRANITE BRANCH.

[Incorporated Acts, 1825, chap. 183; see also 1831, chap. 48; 1836, chap. 160; 1846, chap. 232; 1848, chap. 84; 1854, chap. 271; 1858, chap. 174; 1870, chap. 378; 1871, chap. 54.]

This road was formally opened for traffic on the 9th of October, 1871. It is a branch of the Old Colony and Newport, leaving that road at Atlantic station, 5.50 miles from the Boston terminus, and, running over the location of the Mt. Hope branch, originally constructed to bring gravel for filling a portion of the South Cove flats; it strikes the old Granite railway a short distance from the original terminus of the latter on Neponset River; it then follows the location through Milton to the present terminus in West Quincy.

The length of the road is 3.10 miles; its grades are moderate, not exceeding fifty feet to the mile; the rails are of iron of sixty pounds to the yard, which had been in use on the Old Colony road but replaced while still serviceable by steel, are fish-jointed and well spiked; the ties are of cedar, and number 1,700 to the mile. The depots are two in number and are well adapted to the business the road expects to do. The switches are all of the Tyler pattern. There are three highway crossings; two of these are important roads; they are all at grade, and the two referred to must be considered dangerous.

A peculiar interest attaches to the construction of this road, owing to the fact that it is built over the road-bed of the oldest railway in America, and the one first chartered in Massachusetts; the original road was opened to traffic on the 7th of October, 1826. It was a tram-way, adapted only to horse-power, four miles long, running from the granite quarries of Quincy to a wharf on Neponset River; its tracks were at all gradings laid on a bed formed by filling in between walls of split stone very solidly tied together; the rails were what are technically known as strap-rails, bolted to parallel stone sleepers. The original cost of the road was \$50,000, the whole of which sum was supplied by Col. Thomas Hendasysd Perkins of Boston, though the credit of originating, maturing and executing the scheme is due to Gridley Bryant, its civil engineer. The

road as constructed by Mr. Bryant was successfully operated down to a period immediately anterior to the purchase of its charter by the Old Colony & Newport Railway Co., in 1871.

The original road was designed to facilitate the transportation of granite from the Quincy quarries for the construction of the Bunker Hill Monument; it was not adapted nor was it ever used for the carriage of passengers. It was equipped only with stone-cars, and upon these were transported blocks weighing not less than sixty-four tons in the rough. The present road is intended to do a combined freight and passenger business, connecting the Quincy quarries both with Boston and the tide-waters at Neponset. The amount of freight in the way of granite now awaiting at the Quincy terminus is beyond calculation. In the immediate vicinity of the station there are several millions of tons of stone, formerly regarded as worthless and thrown into waste piles, which has lately become valuable through the introduction into our cities of the square block pavement. From 2,500,000 to 3,000,000 of the paving blocks made of this stone are now annually purchased and laid down by the city of Boston alone, while the present railroad will probably decrease by one-half the cost of carrying them to that city from Quincy. Large quantities of rough and dressed stone for building purposes are also constantly seeking carriage, not only to Boston but to tide-water and to interior points over connecting roads. Owing to the short haul on stone to Boston the tariff rate per mile charged is almost necessarily very high; there can, however, be little doubt entertained that the road in this case was needed, and that it will be both reasonably remunerative in itself and will lend a great stimulus to the district it is intended to accommodate. At present it is simply a branch road; ultimately, however, it will in all probability be desirable to further extend it until it shall again strike the Old Colony & Newport road within the town of Braintree, thus forming a loop road.

The road is built and owned wholly by the Old Colony & Newport Railway Co., and cost, completed, \$75,000, or \$21,430 per mile, of which amount, about \$13,000 per mile was expended in construction.

PROJECTED RAILROADS.

The following list comprises all the projected railroads under existing charters, from the corporators or officers of which any report has been received.

Amesbury Railroad.—From Amesbury Mills to West Amesbury. Chartered, 1869. The corporators have organized, but no further action has been taken.

Amherst Branch Railroad.—Chartered, 1848; charter revived, 1864. From New London Northern Railroad, in Amherst, to Connecticut River Railroad, in Northampton or Hatfield. Charter amended, 1870. The corporators organized under Act of 1864, and a part of the stock was provisionally subscribed for. The amended charter has not been accepted, and the former charter was "long since abandoned."

Ashburnham Railroad.—From Ashburnham Centre to the junction of the Cheshire and Vermont & Mass. Railroads. Chartered, 1871. Stock subscribed for, company organized and assessments paid in. Construction of the road commenced in December, 1871.

Bedford Railroad.—From Bedford, near the mineral springs, to the Lexington & Arlington Branch, in Lexington. Chartered, 1869; time extended, 1870. Corporators organized, but no further action has been taken. The line of the Middlesex Central Railroad is through substantially the same territory.

Brighton Branch Railroad.—From Allston, on Boston & Albany Railroad, through Brighton and Newton to Wellesley, on the Boston & Albany Railroad. Chartered, 1871. Corporators organized, Nov. 20th, 1871. Surveys have been made and a new route is asked for.

East Walpole Branch Railroad.—From Boston, Hartford and Erie Railroad in South Dedham, to East Walpole. Chartered, 1868. Time extended, 1870. No action has been taken under the charter.

Exeter and Salisbury Railroad.—From Salisbury to Exeter, N. H. The Salisbury Railroad was chartered in 1869, and authorized to unite with a New Hampshire corporation, under the name of the

Exeter & Salisbury Railroad. Sufficient stock has been subscribed for by towns and individuals to authorize the construction of the road, and the company is organized; but the subscriptions are on the condition that the road shall be leased to some responsible railroad company. The directors have not yet succeeded in leasing the road.

Forest River Railroad.—From Eastern Railroad in Salem, to some convenient point on the Marblehead Branch. Chartered, 1871. No action under the charter.

Gloucester and Lanesville Railroad.—From some convenient point on the Gloucester Branch or Rockport Railroad in Gloucester, to the village of Lanesville, in said town. Chartered, 1867. Time extended, 1869. No action under the charter.

Grafton and Millbury Railroad.—From some convenient point on the Boston & Albany Railroad in Grafton to Millbury. Chartered, 1870. Corporators organized, but no further action taken.

Holyoke and Belchertown Railroad.—From Holyoke to a point on the line of the Massachusetts Central Railroad in Belchertown. Chartered, 1871. No action under the charter.

Hopkinton Railroad.—From Milford and Woonsocket Branch Railroad in Milford, through Hopkinton to Boston & Albany Railroad in Ashland. Organized under Act of 1870, authorizing the union of the Hopkinton Branch and the Hopkinton & Milford Railroad Companies. Stock to the amount of \$165,000 subscribed for, and eighty per cent. paid in. Construction of the road is in progress, and it will be completed in the summer of 1872.

Lancaster Railroad.—From some convenient point on the Worcester and Nashua Railroad, in Lancaster, to some point on the Lancaster and Sterling Branch of the Fitchburg Railroad. Chartered, 1870. Capital stock subscribed for, the company organized and first assessment paid in. The road is to be built immediately.

Lebanon Springs Railroad.—See Williamstown & Hancock Railroad.

Lee and Hudson Railroad.—From some convenient point on the Stockbridge & Pittsfield Railroad in Lee, to some point on the West Stockbridge Railroad, or the Boston & Albany Railroad

in West Stockbridge. Chartered, 1871. Organized and road located. It is "believed the road may be constructed the coming year, providing fair arrangements can be made with the Boston & Albany Railroad Company to operate the same."

Middlesex Central Railroad.—From the Lexington and Arlington Branch Railroad in Lexington, to the State line at the town of Brookline, N. H. Chartered, 1871. Corporators and associates organized, and measures taken to secure the construction of the road.

Nashua, Acton & Boston Railroad.—See Returns, page 164.

Newburyport City Railroad.—From some point on the Newburyport Railroad or the Eastern Railroad to tide water on the Merrimack in Newburyport. Chartered, 1869. Charter amended, 1870. Stock taken by city of Newburyport and individuals, and the road in process of construction. It will be finished early next summer and is leased to the Eastern Railroad Company.

North Adams & Bennington Railroad.—From North Adams to State line to connect with a road from Bennington chartered by Vermont. Chartered, 1867; time extended, 1869. No action has been taken under the charter.

Northampton & Shelburne Falls Railroad.—Chartered, 1861. Road located between Northampton and Williamsburg; subsequently constructed by the New Haven and Northampton Company. The time for locating the road between Williamsburg and Shelburne Falls was extended 1866, but no action has been taken.

Plymouth County Railroad.—From South Scituate to a point on the Old Colony & Newport Railway between Quincy and Wollaston stations. Chartered, 1871. Corporators and associates organized, and stock partly subscribed for.

Plymouth & Sandwich Railroad.—From terminus of Old Colony and Newport Railway in Plymouth, to the Cape Cod Railroad in Sandwich. Chartered, 1871. Corporators organized, and measures taken to secure the construction of the road.

Plymouth & Vineyard Sound Railroad.—The Vineyard Sound Railroad was chartered in 1861, from Monument station on the Cape Cod Railroad in Sandwich, to Wood's Hole. In 1868 the

name was changed to Plymouth & Vineyard Sound Railroad, and the company was authorized to build a road from Monument station to the Old Colony & Newport Railway in Plymouth. The franchise between Monument and Wood's Hole was subsequently conveyed to the Cape Cod Railroad Company, and that company is now constructing that part of the road. The Plymouth & Sandwich Railroad appears to be chartered for the other part of the proposed line, and no action has been taken for its construction under this charter.

Roxbury Branch Railroad.—From Shawmut Avenue, Roxbury, to the Boston, Hartford & Erie Railroad, near Bird Street station in Dorchester. Chartered, 1867; charter revived, 1871. The corporators have not organized or taken any action under the charter, but an extension of the proposed line to the Boston & Providence Railroad is contemplated.

Southbridge & Palmer Railroad.—From the Boston, Hartford & Erie Railroad in Southbridge to Palmer. Chartered, 1870. Corporators organized. Brimfield and Sturbridge have voted to take stock conditionally, but no further subscriptions have yet been made.

Springfield & Farmington Valley Railroad.—From Springfield to State line in Southwick or Agawam, to connect with a Connecticut railroad. Chartered, 1856; time for location, etc., extended by successive acts. Corporators organized. City of Springfield voted to take stock to the amount of one and one-half per cent. of valuation (about \$350,000), and to guarantee bonds to the amount of one per cent. of valuation. Arrangements are in progress for the construction of the road to connect with the Connecticut Western Railroad.

Springfield & Longmeadow Railroad.—From Springfield to State line in Longmeadow. Chartered, 1849; charter revived 1864; authorized to consolidate with any railroad chartered in Connecticut to connect with it, 1869. Corporators organized. Springfield voted to take stock as in the Springfield & Farmington Valley Railroad, and to guarantee bonds to the amount of one-half per cent. of valuation, but no further action has been taken.

Taunton & Providence Railroad.—From junction of the Old Colony & Newport and New Bedford & Taunton railroads in Taunton to the State line in Seekonk. Chartered in 1869. Corporators have organized but no further action has been taken.

Tyngsborough & Brookline Railroad.—From the Nashua & Lowell Railroad in Tyngsborough, to the State line at the town of Brookline, N. H. Chartered, 1871. Corporators have organized and the line has been re-surveyed, but no further action has been taken.

Weymouth Branch Freight Railroad.—Chartered 1870. No action has been taken under the charter.

Williamstown & Hancock Railroad.—From Vermont State line in Williamstown, to New York State line in Hancock. Chartered, 1852; authorized to consolidate with Lebanon Springs Railroad of New York, '1853; charter revived 1869. Corporators have organized but no further action has been taken.

Wrentham Branch Railroad.—Chartered 1862; time for location, etc., extended by successive acts. Corporators organized, but nothing further has been done.

West Amesbury Railroad.—From village of West Amesbury to Boston & Maine Railroad in Newtown, N. H. Chartered, 1868. Company organized; stock subscribed for and twenty per cent. paid in, and the road is being constructed.

[B.]

COMPLAINT OF THE SELECTMEN OF WOBURN, ON PETITION OF O.
GREEN AND OTHERS, ASKING FOR ADDITIONAL TRAIN ACCOM-
MODATIONS AT WOBURN WATERING STATION, ON THE BOSTON
& LOWELL RAILROAD.

[Heard December 20, 1870.]

In this case the petitioners showed that the station on the main line of the Lowell Railroad, known as the Woburn Watering Station, was the most convenient for them, the station at Woburn Centre, on the branch, being by public roads one and one-eighth miles distant westerly from the Watering Station, and the station known as East Woburn, at the junction of the Stoneham branch with the main line, being by public road seven-eighths of a mile southerly from the Watering Station; and that although some of the petitioners lived between the Watering Station and the Centre, more of them lived northerly and easterly from the Watering Station, and all of them would be much better accommodated by trains stopping at that place. The latest train now stopping at the Watering Station leaves Boston at 5 o'clock P.M., and they asked that the trains leaving Boston at 6 o'clock P.M. should be required to stop there. It was also claimed that the number of passengers at the Watering Station had diminished in consequence of not having a six o'clock train to that point, as formerly, and that if they had such accommodation the number of residents in the vicinity, and consequently of travellers on the railroad, would be increased.

In reply it was shown by the officers of the railroad that the train leaving Boston at 6 P.M. was an express train, designed to take passengers for Lowell, and the northern roads connecting at that city; that the train leaving Boston at 5 P.M. is an accommodation train, stopping at all way stations; that, in accordance with the recommendations of this Board, made last year, this express train now stops to leave passengers from Boston at Wilmington, Billerica and North Billerica, and that if it should be required to make more stops it would be difficult for it to reach Lowell and make the northern connections at the required time, without running at a higher rate of speed than is considered prudent by the

officers. It was also shown that the number of season tickets to the Watering Station is eight, and that the holders of these tickets can use them over the branch to Woburn Centre, or to East Woburn, at the junction of the Stoneham branch ; also that trains leave Boston at 5.15 and 6.30 P.M. for East Woburn, and at 5.15, 6.10 and 6.30 P.M. for Woburn Centre. The officers of the road also claim that the train leaving Boston at 6 P.M. would be too early for the mechanics and clerks, who, as the petitioners claim, desire this accommodation ; that such parties usually quit work at 6 o'clock, and must have after that hour some time allowed to reach the station in Boston, and that these parties are sufficiently accommodated by the trains for Woburn Centre and the Stoneham branch leaving Boston at 6.30 P.M. In regard to the supposed increase of passengers, it was claimed by the officers of the road that the history of the past did not warrant the supposition ; that the population near the Watering Station had increased but very little since the road was first opened, although formerly all trains stopped there ; and also that, judging by the experience at Wilmington, Billerica and North Billerica, since this 6 o'clock train had stopped at those points, there was no probability of increase of business.

In view of the evidence above given, the Commissioners adjudge that the petitioners have not given sufficient reason for requiring the express train for the upper roads to stop at their station, as requested in their petition.

The question in this case involves some consideration of the difference existing between what the Commissioners can but designate as metropolitan and local travel. Every road running out of Boston has a certain point on its line where the metropolitan travel, by which is meant the travel of those families living in the country, but doing all business in Boston, necessarily ceases. This point is generally from nine to twelve miles from the city. At this point the corporation has its engine and car-houses, fuel and watering apparatus, agents, and machinery in general for an extensive and peculiar business. Between this point and the city frequent trains are run, and the close connection existing between the inhabitants along this part of the line of the road and the city is uniformly recognized. Beyond this point a different service is necessarily maintained, and the roads pass into the regions of ordinary local travel. The limits of metropolitan travel are in every case perfectly defined. On the main line of the Lowell road, Woburn junction is the limit. All parties, therefore, desiring, for motives of convenience, economy or health, to live on the line of this road while pursuing their avocations in Boston, must, if they wish for the conveniences of

metropolitan travel, fix their homes within the limit of that travel. It is manifestly out of the question for this Board to recommend railroad companies to extend the limits of a costly and complicated service, merely to suit the convenience of a few individuals who have seen fit to settle outside the limit of that service. The petition, therefore, in this case could not be sustained on the ground of convenience to metropolitan travel. It remains to consider whether any recommendation could be based upon it as regards the just and reasonable demands of ordinary local travel. The Commissioners wish here very distinctly to state that they cannot countenance the theory implied, if not directly stated by the officers of the railroad, that a railroad should not furnish any train service, or other accommodation for the public, which does not at once and directly remunerate the road for the expense, if it does not afford it a profit. On the contrary, the Commissioners believe that in many cases a railroad may be expected to furnish some accommodation for the public which does not afford it any immediate profit, or which may even cause them some apparent loss, while in the long run, and in its effect upon the general business of the road, it will be of advantage to the company. In return for privileges granted by the public, the railroads must expect to bear some burdens.

The general rule, in cases like the present, is sufficiently clear. Every road running out of Boston recognizes and supplies the wants of the local, distinguished from its metropolitan travel, by running an outward train from fifteen to twenty-five miles from Boston at or after 6 P.M. The Lowell road constitutes the single exception to this rule. Ordinarily such an exception would call for a very decided recommendation on the part of this Board. The case of the Lowell road is, however, very peculiar. It has almost no local business on its main line beyond Woburn junction. The Lowell travel is amply accommodated by through trains, which ought not to make local stops. Persons going to Lowell at or about 6 P.M. will seldom take a slow local train. A 6 or 6.30 P.M. train, therefore, beyond Woburn junction, must rely for its support almost wholly on the travel of persons desiring to stop between Woburn junction and Lowell. This is a distance of sixteen miles. The average cost per mile run of the Massachusetts railroads, by the last return, was \$1.37½. Allowing the cost in this case to be only \$1 per mile run, the expense of running this train would be about \$5,000 per annum. The evidence presented to the Commissioners showed that this train would not probably accommodate, at a liberal estimate, over twenty persons a day, and these persons would not average to the road \$50

each for outward trips, resulting in an expense of \$5,000 for a return of about \$1,000. Perhaps had a local train about this hour been run permanently for many years, it would have given better remuneration; but in the history of the road an accommodation train at this hour has been subject to frequent vicissitudes, run during one year, or one season, and not during another, and subject to change or discontinuance, as the exigencies of other business on the line seemed to require.

If the Commissioners were to make any recommendation in this case that the road should run another train, it must be based on the understanding that the arrangement proposed was to be permanent. This is an essential consideration in any arrangement, and the Commissioners have no desire to recommend temporary experiments. While, therefore, they wholly discountenance the theory that a railroad corporation is not called upon to do any business which is not immediately remunerative, they must recognize some proportion existing between the cost of a permanent arrangement and the probable return from it. Were the return in this case at all commensurate with the apparent outlay, the Commissioners would not hesitate to recommend to the Lowell road the arrangement in use on all the other roads. Under the existing circumstances, however, they are not disposed at present to do so.

It only remains to consider the propriety of requiring the 6 P.M. express train, which now stops at Wilmington, Billerica and North Billerica, when it has passengers for those stations, according to the recommendation of this Board in 1869, also to stop at the Woburn Watering Station. Were the people at this station in the same circumstances as those in the stations north of them, having no other train that would at all accommodate them, the Commissioners would, without hesitation, advise the road to stop for their accommodation. But as it appears that they can be accommodated by the trains to Woburn Centre and to Stonham at the hours they desire, though left a little farther from their homes, the Commissioners do not think a sufficient reason has been shown for the action desired by the petitioners.

REPORT ON THE PETITION OF CHARLES HAMANT AND FORTY-EIGHT OTHERS, FOR A REMOVAL OF THE DEPOT OF THE BOSTON, HARTFORD & ERIE RAILROAD COMPANY, IN THE TOWN OF MEDFIELD.*

The Commissioners viewed the premises and different localities referred to in this petition, and heard the statements of all parties interested, on the 7th day of February.

The station at Medfield was located and built in 1861. The people of the vicinity were informally consulted in regard to the location by the officers of the corporation, and contributed both labor and material to the building. The location selected met with popular approval, and the only question was between the present site and one some distance nearer Boston, which has since been otherwise provided for. When the Mansfield & Framingham road was built, for reasons unnecessary to specify, it was located across the Boston, Hartford & Erie road at grade, and at a point some 1,200 feet beyond the Medfield station. To this point of intersection, public ways have since been laid out by the town of Medfield, upon the supposition that a station-house common to the two roads would be erected here to facilitate the exchange of passengers and luggage between the intersecting roads. And the petitioners now ask for a special Act compelling the two corporations to join in erecting such a station.

Representatives of each of the two intersecting roads were present at the hearing. The Framingham & Mansfield road made no objections to bearing its proportion of the cost of the proposed work, but declined to recognize any equities existing in the Boston, Hartford & Erie, on account of the changes that company was necessitated to make because of the location of the other road. The Boston, Hartford & Erie admitted the greater public convenience which a joint station would afford, but showed, from the lay of the ground, that much the heaviest portion of the expense incurred in making the change, would fall upon it; it claimed that its present accommodations were ample, that a removal would necessitate their total abandonment, that the new station approaches, etc., etc., would cost the corporation some \$5,000 or \$6,000, that the financial position of the Boston, Hartford & Erie railroad was matter of public notoriety, and that it ought not to be subjected by special Act to an outlay which at this time, being in the hands of receivers, it had no means of meeting.

* Referred to this Board by the Committee on Railways.

The petitioners stated that the town of Medfield lay about a mile and a half from the present station by the old road, and a mile and a quarter from the point of railroad intersection by the new road. The Boston, Hartford & Erie road did not pass within a mile of the centre of population, but the Mansfield & Framingham road, after crossing the Boston, Hartford & Erie, passed directly through it. Travel to and fro between Boston and Medfield therefore naturally uses both roads, changing from one to the other at the intersection to which they petitioned to have the depot removed. No town meeting on the subject had been held or public action had. The matter had, however, been long and generally discussed, and the change was believed to be in accordance with a large preponderance of public desire.

Two remonstrants appeared and made statements. They complained of want of notice, and said that the subject had not been discussed, that the petition for a change had not been generally circulated, and had been prepared in a single day; that the change was not demanded by public convenience, and was in the nature of an interference with vested rights.

Under all the circumstances, the Commissioners could not but conclude that a clear and manifest preponderance both of public convenience and public desire probably, in this case called for the change proposed. They would, therefore, be inclined to recommend it but for the objections stated by those representing the Boston, Hartford & Erie road. The proposed change would inconvenience no one much, and would greatly accommodate very many. So far as the Commissioners could judge, it would have no appreciable effect on any existing business or the value of any property. It would merely enable both roads to do their work more conveniently for the public. The allegations of want of notice and insufficient discussion in the case are not, however, to be disregarded. The moving and re-locating of railroad stations, is a very important subject,—far more important than nine questions out of ten which are made the subject of public town action. In the opinion of the Commissioners, a matter of this consequence to local communities should never be acted upon by the legislature on the mere request of irresponsible private individuals; public town notice and action should, in all cases, be required as a guarantee against surprise, and to insure discussion. This is necessary before the smallest town way can be laid out, and the removal of a railroad depot is of vastly more importance. Neither do the Commissioners wish to imply that the action of a town meeting should necessarily be considered decisive when in favor of a change. The

sound rule they believe is that a change of this sort must be clearly and manifestly demanded by a heavy preponderance of both public convenience and popular desire, before legislative authority should be exerted to effect it. Any rule less stringent than this would place our railroads, and the facilities of those who may use them and depend upon them, at the mercy of any popular majority which might for the moment get control of a town meeting.

In this case there is no evidence that the subject has been fully and generally discussed, or that the minority, if any exists, has had an opportunity to make itself heard. The petitioners at the hearing also intimated that they desired more than a merely permissive Act,—they wished one compelling the roads to make the desired change. In view of the position of the Boston, Hartford & Erie road in the courts, both State and national, the Commissioners cannot recommend the passage of such an Act at this time. They do not question the power of the legislature to pass such an Act under ordinary circumstances, but to do so here would be to take means set aside for creditors, and to apply them to a measure of mere public convenience and not of actual necessity.

For the reasons above stated, the Commissioners would respectfully recommend that the petitioners have leave to withdraw. While making this recommendation the Commissioners would also call attention to the fact that this is one of a numerous class of similar cases which should not take up the time of the legislature. The whole subject is one which should be regulated by a general law authorizing, under any restrictions the legislature sees fit to impose, the re-location and discontinuance of existing railroad stations, whenever it shall be proved to the satisfaction of this Board that such re-location or discontinuance is clearly and manifestly demanded by a decided preponderance of public convenience and popular desire. The propriety of passing such a law at the present session of the legislature is respectfully submitted.

REPORT ON THE PETITION OF THE FITCHBURG RAILROAD COMPANY, FOR AUTHORITY TO CONSTRUCT ADDITIONAL TRACKS IN THE TOWN OF WATERTOWN.*

This is a petition of an existing railroad corporation asking for authority to lay down an additional track across a public highway

* Referred to this Board by the Committee on Railways.

outside of its location. No provision for such a case is made under the General Statutes. Two very similar cases are provided for, (1) the laying out of public ways across a railroad, and (2) the laying out a railroad across a public way, *within its location*. The county commissioners have ample and final powers in both these contingencies.

The case in point is very simple and the facts are undisputed. The corporation had originally a right to the five-rod location. It took forty-six feet only. It has recently purchased property of private parties outside of this location on both sides of the highway; built upon the land so obtained a turn-table, on one side of the road and six feet from it; and on the other side of the road has laid down a switch-track up to the limit of the road, so as to get access to the turn-table on the other side of it. This switch-track crosses the public way outside of the forty-six feet originally taken by the corporation, but within the five rods which it might have taken had it seen fit. The corporation now asks by special Act to be restored to the right which it might have availed itself of but did not.

If the view taken by the Commissioners of the law and usage, well established in such cases, is correct, the facts on which a decision of it must rest do not admit of dispute. This is a petition to lay out an additional track across a public, and greatly frequented way *at grade*,—this track to be used for all freighting operations at the point, and for approach to a turn-table. The corporation offers to take every precaution to reduce all danger from the use of the track to a *minimum*. That it will do so the Commissioners entertain no doubt; that all such crossings are dangerous and occasion great inconvenience to travel on the public way thus crossed is equally free from doubt. In this particular case both the inconvenience and danger are necessarily increased by the fact that, to use the proposed switch, both locomotives and freight cars must necessarily pass to and fro over two greatly frequented public ways, one of which is also used for a horse railway.

The obvious and very proper rule in all cases of crossings at grade is distinctly laid down in §§ 58-9 of chap. 63 of General Statutes, that they are not to be permitted except on "special authority," and "unless public necessity so requires." This rule would clearly hold as to additional tracks over which locomotives are to pass, to and fro, from turn-tables, and freight trains are to be made up. The safety and convenience of travel is not to be affected by such additional passing unless the public necessity manifestly requires it. All such operations must, wherever practicable, be con-

ducted within yards and away from crossings. Does a clear public necessity demand an exception by special legislation to this rule in this case?

The corporation does not claim that this crossing involves any *general* question of public convenience. The question is a purely *local* one; having this switch-crossing and turn-table, the corporation maintains that it will furnish more facilities and greater convenience to Watertown than it can without it. So far as the corporation and general public convenience is concerned, the turn-table can equally well be placed at a distance from the Watertown station and away from all highways, within the neighboring cattle-yards of the company.

The question then finally reduces itself to this very simple issue: Does a clear and manifest necessity exist in the local, public necessities and convenience of Watertown for the laying out of this additional grade crossing? The burden of proof is upon the corporation. It is manifestly impossible for the Commissioners to report that a clear and indisputable case of public local necessity is established, while the great majority of those dwelling in the locality, and to serve whose necessities the exception is to be made, vehemently declare that the proposed crossing and additional track and turn-table will greatly inconvenience and annoy them, endanger their safety, and in no way, they believe, promote their interests. This view of the case has been regularly and officially taken by the citizens of Watertown. At a large town meeting held on the 25th inst., the selectmen of the town were instructed accordingly, and appeared before the Commissioners in earnest opposition to the petition. The corporation offered to produce, and doubtless can produce, numerous individual citizens expressing a contrary opinion. The Commissioners do not see how this could affect the decision. Where a clear and decisive preponderance of evidence as to public necessity and convenience is required to warrant an exception to a general and salutary rule, the Commissioners do not see how their own private opinions or those of individuals can be made to outweigh the official remonstrance of the whole community, the safety and convenience of which only is involved.

The Commissioners would recommend that the petitioners in this case have leave to withdraw.

REPORT ON THE PETITION OF THOMAS M. HOPKINSON AND OTHERS,
FOR A LAW REQUIRING MORE EQUAL AND JUST RATES FOR
SEASON TICKETS ON THE RAILROADS IN THIS COMMONWEALTH.*

A hearing in this case was had on Saturday, the 25th of February, when certain of the petitioners appeared and made a statement as to what was desired. A general law was asked for, regulating the rates of reduction below the usual fares, at which season and package tickets should be sold throughout the Commonwealth. The petitioners called attention to the fact that no proportion existed between the price of season tickets on the railroads to various points, established on the basis of the distances of those points from the common terminus for such tickets. For example, a ticket to a point one mile from the terminus might be \$7 per quarter; one to a point eight miles from the same terminus, \$15 per quarter; a third to a point twenty miles from the same terminus \$30 per quarter. The petitioners wished a law providing for the sale of these tickets on something approaching a *pro rata* principle, the price of the ticket being fixed approximately to the number of miles of road over which it gives the right to travel.

There was no peculiar hardship in the case of the petitioners. They travel from Groveland to Haverhill,—a distance of three miles,—for \$9 per quarter; that is about six cents a trip. None of the roads running out of Boston to points equally distant, whether operated by steam or horse-power, afford any better rates to the public as will be seen on examination of the subjoined table (page ccviii). The rates paid by the petitioners may therefore be assumed as the standard rates of the roads in this State.

The question is twofold: (1) whether the amounts generally charged for season tickets over short distances on the roads of the State are in themselves excessive; and (2) whether these amounts are excessive as compared with those charged for longer distances.

The first question has already undergone some very recent examination in connection with the Quincy petition for cheap workmen's trains. (Leg. Doc's, 1871;—House, No. 176.) A rate equivalent to 50 cents a week for one trip each way was suggested, after examination of the returns, as the lowest reasonable basis for the trial of that experiment, this rate to be uniform for all distances run by the proposed cheap trains. The trains referred to by the petitioners are not exceptional, or experimental trains. They ask for a general law applying to tickets

* Referred to this Board by the Committee on Railways.

good in all trains. The rate alleged to be excessive is 72 cents per week, in place of 50 cents. If 50 cents a week is to be considered a fair rate for an experimental system of cheap trains, the Commissioners are unable to say that they consider 72 cents in itself an excessive charge, calling for remedial legislation, for season tickets on ordinary trains. It is as low as ever has been, or now is usual on the roads of this State. Whether a lower scale of rates can be successfully adopted is yet a matter of experiment. Legislation looking towards it would at this time, in the opinion of the Commissioners, be premature.

Can the rate named be considered excessive as compared with the rates charged for longer distances? When only \$18 per quarter is charged for eight miles, should \$9 per quarter be regarded as excessive for two miles? The formation of an opinion upon this point involves some consideration of the principle of the season-ticket business. Any extensive demand for these tickets can exist only in the neighborhood of considerable business centres, and its accommodation requires a regular equipment of cars, stations, &c. The trains which accommodate the travel run a given distance. The company must necessarily supply cars, &c., for the whole of such travel, no matter at what point it may take the train, throughout that distance. These trains, therefore, do not continually empty and fill, but they arrive, or they start full, and go over a large portion of their route more or less empty. The heaviest item of expense to the corporation in this case is the initial cost of starting the train. Practically it costs a railroad company as much to carry a passenger a small part of any given route which a train runs as it does the whole of it. The difference between hauling an empty seat and a seat with a passenger in it can hardly be estimated. Take, for instance, a regular train between Boston and Albany. The dead weight of such a train will not average less than 150 tons. The mere cost of running it in the items of fuel and in the wear and tear of rolling stock and road-bed is about fifty cents per mile, or three mills per ton per mile. If, therefore, the train has to be run, it makes to the railroad company a difference of not more than five cents in the cost of running it whether a passenger leaves the train a mile out of Boston or goes through to Albany,—always, of course, provided that no other passenger gets in to occupy the vacant seat. If, therefore, fares on railroads were regulated on the principle of cost, or each person paying for what he received, a one-price system for the train route, rather than the system petitioned for, would have to be adopted. The principle involved is perfectly illustrated in the postal system. The

initial cost only of forwarding letters is regarded in this case and rates of postage are uniform without regard to distance.

For obvious reasons the railroad companies cannot apply this principle, however just in reason it may be, to ordinary, casual travel. They can as regards this only average the cost and charge according to distance. They can, however, and do recognize the distinction as regards regular and reliable local travel. The initial cost of starting the train is here approximately divided among all those for whose convenience the train is started; and, in addition to this, each passenger pays for the distance he travels, be the same longer or shorter. This rule of division the Commissioners believe to be a just one. Such a law as is petitioned for would very unequally distribute an expense incurred for the common benefit. So far from inclining towards it, the Commissioners are, on the contrary, disposed to believe that for a large regular and daily travel over short distances to and from business centres, the one-price system would be the more just and equitable. The cost of depots, of road-bed, of motive-power, of rolling stock and of officials incurred in running these trains is the same no matter what distance the passenger goes;—the only difference to the corporation is the inappreciable one of the cost of hauling perhaps 130 pounds more or less. The initial cost constitutes probably at least nineteen-twentieths of the whole expenditure.

For the reasons above stated the Commissioners would respectfully recommend that the petitioners have leave to withdraw.

ROAD.	Distance in Miles.	Season-ticket rates per Quarter.
<i>Boston & Maine Railroad Company.</i>		
Boston to Somerville,	2	\$10 00
“ Wellington’s,	3	13 50
Andover to Lawrence,	3	9 00
<i>Boston & Lowell Railroad Company.</i>		
Boston to Winter Hill,	3	10 00
Chelmsford to Lowell,	3	10 00
<i>Fitchburg Railroad Company.</i>		
Boston to Cambridge,	4	10 00
<i>Boston & Providence Railroad Company.</i>		
Boston to Roxbury,	2	7 60
“ Boylston Street,	3	9 00
<i>Old Colony & Newport Railway Company.</i>		
Boston to Savin Hill,	3	12 50
“ Harrison Square,	4	14 00

REPORT ON THE PETITION OF THE HOLYOKE WATER POWER
COMPANY RELATIVE TO THE LOCATION OF THE HOLYOKE &
WESTFIELD RAILROAD IN HOLYOKE.

This subject was brought before the Board on a petition originally intended for the legislature, but presented to this Board upon an intimation of the Chairman of the Joint Committee on Railways, that this would be the proper course to pursue. The Board took cognizance of it under the general supervisory authority conferred by section 2 of chapter 408 of the Acts of 1869.

A hearing was had on the 12th day of May, and the locality was examined by the Board. The Holyoke Water Power Company, the Holyoke & Westfield Railroad Company, and their lessees, the New Haven & Northampton Company, were severally represented at the hearing, and certain persons intending to build factories in the neighborhood of the proposed depot of the Holyoke & Westfield road were also present. No party claimed to represent the citizens generally unless it was the Water Power Company, who alone advocated a change of location. The Connecticut River Railroad Company was not represented.

The facts in the case are as follows: the Connecticut River Railroad is located through the town of Holyoke. The Holyoke & Westfield Railroad was chartered by chapter 379 of the Acts of 1869, to run from a certain point in the town of Holyoke, to connect with the New Haven & Northampton Railroad at some point in the town of Westfield. The Holyoke & Westfield Railroad Company is now constructing its road, grading and laying out its depot grounds, and locating its branch tracks in the town of Holyoke without reference to the stations, tracks or branch tracks of the Connecticut River Railroad. The petitioners allege that such an arrangement is injurious to the property of the Water Power Company, contrary to well-understood principles of railroad connection and traffic, and subversive of the best interests of the town; they accordingly desire such action from the legislature, or from this Board, as will cause the two roads to unite in the construction of a union depot, and to make use, as far as practicable, of common branch tracks.

On general principles there can be no question as to the utility and economy of union depots. The railroads of every community should constitute a system, and not exist as petty, disconnected and often conflicting members. In the early days of railroad construction this principle was ignored, and, in consequence, both

in this country and in Europe, millions of money are now annually spent to bring about that which in the beginning could have been effected without additional outlay. During the present session of the legislature two striking examples of this waste of means have been brought to public notice—the one in relation to the terminal facilities of the northern roads in Boston, the other in relation to the union depot in Worcester. In both cases the public exigency imperatively demands, at almost any cost, some action to undo just what is now being done in Holyoke. As the population and business increases in this State, and as our railroad system becomes more and more complex and inter-dependent, the tendency in the direction indicated will become more pronounced. The interests of this community cannot permanently be sacrificed to the jealousies and personal dislikes of railroad managers, and yet it will be found that these jealousies and dislikes have led to arrangements of lines which it will prove both difficult and costly to rearrange.

In the case now under consideration, in view of the present position and probable business of the two roads, there is less likelihood than usual that there will be any considerable interchange of passengers or freight between them. Nevertheless, it is with great regret that the Commissioners see railroads centering in any town pursuing the course now begun at Holyoke. They are convinced that both the railroads and the town will sometime, and perhaps at no very late day, find cause to regret it, and may yet be obliged to undo all that they are now doing.

The power of the Commissioners is limited to the making of recommendations, and, in this case it is extremely doubtful whether it is within the power of the legislature to interfere effectually. The charter of the Holyoke & Westfield Railroad Company specifically limits to a location “commencing at any convenient point on Front Street, in the town of Holyoke.” The company has accordingly located its station on Front Street, expended considerable sums of money there, and proceeded to build its road in exact compliance with the terms of its charter. (Acts 1869, chap. 379.) It has gone further; it has leased its road, under a power contained in section four of its charter, to the New Haven & Northampton Company, and the contract especially provides for a road to “commence on Front Street.” In consideration of the hostility well known to exist between the New Haven & Northampton Company and the Connecticut River Railroad Company, any action compelling the Holyoke & Westfield Railroad Company to commence its road at the station of the Connecticut River road, instead of on Front Street, could hardly fail to be regarded as invalidating this contract.

Under these circumstances it is manifestly out of the question for the Commissioners to take any steps in compliance with the prayer of the petitioners. The legislature has, for reasons of which it is the only judge, disregarded in this case the general principles of railroad connection referred to at the beginning of this Report. The charter might perfectly well have authorized the Holyoke & Westfield Railroad Company to locate its road from the station of the Connecticut River Railroad Company, or even generally from "some convenient point in the town of Holyoke"; this, however, was not done, but a point on Front Street was specified. It is to be presumed that this limitation was designedly imposed. Very possibly the legislature sought to excite a railroad competition and therefore intended to keep the two companies in separate stations. In any event, however, it is clearly beyond the province of this Commission to take any action in a case where the rights of parties are so unmistakably defined by law.

COMPLAINT OF THE SELECTMEN OF SHARON, ON THE PETITION OF
D. W. PETTEE AND OTHERS, AGAINST THE BOSTON & PROVIDENCE RAILROAD COMPANY.

This matter came originally before the Commissioners on the petition of W. C. Myrick and one hundred and three others, inhabitants of Sharon, calling attention to the existing lack of railroad accommodations given to the town, and particularly asking for an early and late train to and from Boston. This petition bore date May 3, 1871, but was referred back to the petitioners, that the subject might be brought before the Board in the manner prescribed by statute, through the action of the selectmen. Upon the 16th of June the present petition was filed, approved by the selectmen, and referring exclusively to "an early and late passenger train to and from Boston, leaving Sharon about 6 or 6.30 o'clock A.M., and returning, leave Boston about 6 o'clock P.M." Subsequently, and before a hearing took place, a public town meeting was held in Sharon, on July 5th, and it was voted that the town appear in the matter by a committee who were instructed to "seek to get more passenger trains, one to reach Boston as early as seven o'clock and twenty minutes (7.20) A.M.; trains to leave Boston about 2 P.M. and 6 P.M. Also to secure a freight station near the passenger station at Sharon Centre. Also to secure better facilities for shipment of freight to New York.

Also better express facilities." Petitions in aid were also received from citizens of Mansfield, through the selectmen of that town, asking for a "passenger train that shall leave Mansfield for Boston about 6 o'clock A.M.; and returning, leave Boston at about 6 o'clock P.M.; said train to stop at Foxboro' and Sharon."

Several subjects were thus brought before the Board.

1. The question of early and late trains between Mansfield and Boston, stopping at way stations.

2. The increase of freighting facilities at Sharon.

3. The improvement of freighting facilities to New York from Sharon.

4. The stopping at Sharon of the two o'clock passenger train from Boston to Providence.

5. The increase of express facilities afforded at Sharon.

A hearing was had on the petition and accompanying papers at the office of the Commission on July 7th, and at Sharon on July 15th, and was concluded on July 20th. Many witnesses were examined, and the case for both sides was argued by counsel.

The only point included in the original proceedings was that of early and late trains. Upon this subject the position taken by the counsel for the corporation seemed to the Commissioners to be the correct one — that corporations are called upon to afford increased facilities only in case that such facilities should give promise of being reasonably remunerative; they should not be called upon to furnish such facilities, unless in exceptional cases, where no returns approximating the outlay involved could be anticipated within any immediate lapse of time. The question in the present case was, therefore, whether an early and late train, as petitioned for, would probably involve, for an indefinite period, any decided loss to the corporation, for it was not contended that this case was exceptional in character. Very many witnesses were examined, whose evidence was conclusive to the fact that the prosperity of Sharon had been greatly retarded by the want of the facilities asked for, and that a large increase of travel to that place would ensue if they were conceded. This was not denied by the corporation. The question was thus reduced simply to one of cost. The corporation took the ground that, as the distance between Boston and Mansfield was about twenty-five miles, and the average cost of operating their road was \$1.71 per train mile, therefore that the cost of the round trip petitioned for would be \$84.50 per diem, or \$26,839.75 a year. As the present total receipts from the station at Sharon by the corporation were but slightly in excess of \$9,000 per annum, it was contended that the desired trains could

not be approximately remunerative, and should not be required of the company.

This line of argument has heretofore been several times urged upon this Board in similar cases, but it seems to be fallacious in the extreme. Were this the measure of cost applied by the corporations themselves in all cases, it is extremely doubtful whether additional trains would ever be put upon any route. In putting on extra trains, corporations are perfectly aware that the whole plant of a road, nearly the whole of its service, much of its rolling stock, and a portion of its motive-power are fixed quantities. Once in existence the granting or withholding of accommodations, within reasonable limits, affects them only in an inappreciable degree. Trains such as those petitioned for in this case are not trains only for the accommodation of Sharon, or any other locality, but serving the whole line they constitute a mere extension of the service of trains already in use. In the present case, the Boston & Providence Railroad Company already run trains at the hours petitioned for to South Canton, within three miles of Sharon, and to extend the service of these trains to Mansfield would make an additional trip of twenty miles a day.

The questions for the Commissioners to decide are, then, what new and additional expenditures on the part of the corporation would such an increase of service involve, and would the increased business to be derived from it remunerate the company within a reasonable time. The Commission has been wholly guided in coming to a conclusion upon this point by the evidence given in the case by the Superintendent of the Boston & Providence road. The whole annual cost—cars, motive-power, service and wear and tear of road-bed—of a train made up of a locomotive, a baggage and two passenger cars running one hundred miles a day, was estimated in detail as not exceeding \$25,000 per annum.

The items were as follows :—

Motive power complete, \$45.00 per diem,	. .	\$14,085 00
Cars, cost \$11,000; 15 per cent.,	. \$1,650 00	
Wages (conductor and brakeman),	. 1,616 00	
	<hr/>	3,266 00
Wear and tear of track, 23 cts. per mile,	. .	7,199 00
	<hr/>	
Total, . . . . .	. . . . .	\$24,550 00

This estimate, it is believed, covers everything except those fixed expenses of the road which are only inappreciably affected by the

putting on of such a train as that desired. In the present case the motive power would be required for about twenty miles per diem, in addition to the present requirements; the car service would be required for about fifty miles; and a full wear and tear of the road-bed for twenty miles, and a partial wear and tear for thirty miles per day should also be added. Making these deductions the Commissioners are unable to see, on the basis of the figures put into this case by the superintendent of the road, how the increase of service petitioned for could involve the corporation in any new expenditure in excess of \$7,000 per annum.

Would the additional accommodation thus afforded lead, within a reasonable time, to an increase of \$7,000 per annum in the receipts of the company? Upon this point the Commissioners were largely aided in forming an opinion by the evidence of the superintendent. He furnished a curious illustration of the result of affording sufficient railroad accommodations in the case of Stoughton. This town is a short distance off from the main track of the Boston & Providence road, but connected with it by a branch; its population is considerably larger, being 4,914, while that of Sharon is 1,508; but it is also one mile further from Boston than Sharon. Owing to railroad competition, however, it has early and late trains. Yet the superintendent stated that whereas there were but six season-ticket holders in Sharon, in Stoughton there were between sixty and seventy on his road alone, and that the passengers on the early and late trains to that town filled two cars. This also is but that portion of the Stoughton business which falls to the share of the Boston & Providence Railroad. The Commissioners are further officially advised that the Old Colony & Newport Railway has an average of forty season-ticket holders from the same town, while the total passenger receipts of this last road from Stoughton, amounted to over \$14,000 per annum. Allowing for the difference of population there would seem to be five times as many holders of season tickets in Stoughton as Sharon.

The accumulation of evidence, however, upon this subject was too strong to be resisted, and satisfied the Commissioners that the desired trains, if put on between Boston and Mansfield, would be remunerative almost from the start. They involve no new outlay, as all facilities for housing and starting trains already exist at Mansfield, and the only difficulty suggested by the corporation, apart from expense, lay in the motive-power between the junction of the Stoughton branch, where the early and late trains leave the main track, and Mansfield, a distance of ten miles. This is a question of practical management with which the Commissioners do

not feel called upon to deal. The superintendent of the road failed, however, to convince them that this was a difficulty which it would be impossible to overcome.

As regards so much of the petition as relates to increased facilities for the receipt and delivery of freight at Sharon, it appeared that the passenger station at Sharon is placed upon a thirty-seven foot grade; owing to the difficulty and danger involved in the handling of freight cars at this point, the corporation has done all its freight business at another point in the town nearly a mile distant and at the summit of the grade. The petitioners asked to have freighting accommodations at the passenger station, in addition to those now afforded at the summit. The corporation in reply showed that they could much more conveniently to themselves accommodate freight and passengers at one station, if the grade was not an obstacle to overcome which would involve a heavy outlay. In the view the Commissioners have taken of this question, it is not necessary to go into an estimate of the cost which the granting of the desired facilities would entail upon the company. The entire freight received and shipped at Sharon, in 1870, was returned to the Commissioners as 2,397 tons, upon which \$2,514.22 freight money was received by the road. The petitioners do not pretend that public opinion in Sharon is not divided as to the most convenient place for receiving and delivering their freights, but they ask to have two points, less than a mile apart, for the handling of the amount specified. Such a request does not strike the Commissioners as reasonable. Were the petitioners of one mind, and did they unite in asking that all freight should come to their passenger station, it might be necessary to discuss the ulterior questions as to obstacles and expense; as such is not the case, however, the Commissioners do not think it necessary to enter further into this question.

As regards that part of the petition which relates to the giving increased facilities for shipment of freight from Sharon to New York, the evidence showed that the present arrangement is not so convenient as that in use some years ago. The corporation in reply explained the way in which this inconvenience to certain towns arose out of the increased competition between Boston and New York, to which their line was subjected. The explanation seemed to the Commissioners to be reasonable and satisfactory, and no sufficient grievances to warrant any recommendation in this respect were proved by the petitioners.

As regards the stopping at Sharon of the two o'clock express between Boston and Providence, the evidence was that this train

was put on to accommodate a large number of persons doing business in Providence and Boston, and that to convert this into a local train would greatly delay and inconvenience all this class of travellers. If the results of increased railroad facilities should prove as favorable to the growth of Sharon as the petitioners hope, there is every reason to suppose that the corporation will meet all increased local demands by increased local accommodations; should it fail to meet every reasonable expectation in so doing, it may, perhaps, become the duty of this Board to remind it of its responsibilities. Until, however, some absolute increase can be shown, this Board, though very willing to aid the citizens of Sharon in securing their own rights and privileges, is not willing to make any recommendation which would impair the reasonable rights and privileges of other people. Upon this point the petitioners failed, in the opinion of the Commissioners, to show sufficient grounds for interference.

As regards the increase of express facilities, the petitioners showed very conclusively that a practical monopoly of this business, so far as Sharon is concerned, was secured by the company to Earl & Prew; that the competition of independent local expresses was decidedly discouraged, and that the accommodations afforded by Earle & Prew to Sharon were very insufficient. Numerous witnesses concurred in expressing the opinion that an independent local express would be a great convenience to the people of Sharon, and that the business of the place would sustain it. Upon this question the Commissioners do not deem it necessary to express any opinion. The subject of the rights of expressmen upon railroads, under existing statutes, was discussed at length by them on the complaint of the mayor and aldermen of the city of Lowell, against the Boston & Lowell Railroad Company, and the report in that case was published in the appendix (page 101) of the first annual report of this Board. If, as the petitioners assert, the business of Sharon will support a local express, and any one can be found to take charge of it, the Act of 1867 (chap. 339, § 1) compels the Boston & Providence Railroad Company to give such expressman "reasonable and equal terms, facilities and accommodations, for the transportation of himself, his agents and servants." It was not in evidence that the company had neglected or refused to do this, though it was not denied on their part that they would do it very reluctantly. This Board, however, very clearly cannot make the reluctance of a company, or even its neglect or refusal to comply with a distinct statute duty, the subject of a recommendation. If the petitioners desire to establish a local express for Sharon, they

already, and without any action on the part of this Board, have a perfect right to do so. Should the company, upon application therefor, then refuse to give such express all "reasonable and equal terms, facilities and accommodations," their refusal or failure to do this would constitute, not a ground for any recommendation on the part of this Board, but simply an opportunity for an enforcement of the statute penalties in such case prescribed.

After hearing the parties, and a full consideration of the facts set forth in the above complaint and petition, the Commissioners find the prayer of the petitioners reasonable in so far as it relates to the affording early and late trains between Boston and Sharon, and they accordingly recommend the Boston & Providence Railroad Company to establish such a train, leaving Mansfield to arrive in Boston not later than 7 o'clock A.M., and returning to leave Boston not earlier than 6 o'clock P.M.; and in relation to all other matters set forth in the above complaint and petition, the Commissioners adjudge that the petitioners have failed to establish such a condition of facts as would warrant any recommendation or action on the part of this Board.

PETITION OF SAMUEL WILLISTON FOR THE RELOCATION OF CERTAIN
RAILROAD TRACKS IN EASTHAMPTON.

Upon the petition of Samuel Williston, Esq., of Easthampton, in the matter of relocating a portion of the tracks of the New Haven & Northampton Railroad and the Mt. Tom & Easthampton Railroad, the Commissioners went to Easthampton and examined the premises, and became satisfied that they had no power to decide upon questions of that character, and therefore confine themselves to a statement of facts in the case as they were developed.

The Mt. Tom & Easthampton Railroad was represented by its president, Mr. D. L. Harris, and Mr. Williston represented his own wishes in the matter. No one appeared to represent the New Haven & Northampton Railroad.

It appeared that the New Haven & Northampton Railroad was built many years ago, and has long been open for transportation of passengers and freight at this point. Since that road was opened, Mr. Williston has built a large cotton-mill on the easterly side of the track, the main body of the mill being about seventy-five feet distant therefrom.

The track of the Mt. Tom & Easthampton Railroad, built last year, is laid about mid-way between the mill of Mr. Williston and

the track of the New Haven & Northampton Railroad, and the petition of Mr. Williston was, that the track of these two roads might be moved further from his mill, and this to be accomplished by straightening the track of the New Haven & Northampton Railroad, which is here upon a curve, for a distance of about two thousand feet, moving it opposite his mill, about twenty-five feet westerly. This would allow the track of the Mt. Tom & Easthampton Railroad to occupy substantially the present line of the New Haven & Northampton Railroad at that point.

The objections to these changes, if any there are, are not of an engineering character, and the expense of making the change the petitioner is willing to pay, in consideration of the greater convenience and safety in operating his mill.

[C.]

COMMONWEALTH OF MASSACHUSETTS.

RAILROAD COMMISSIONERS' OFFICE, No. 7 PEMBERTON Sq., }
BOSTON, August 10, 1871. }*To*

SIR:—The Board of Railroad Commissioners takes this occasion to suggest to you a careful revision of the freight and passenger tariffs of the railroad of which you are one of the officials, with a view to making such reduction in charges as may seem to be practicable. It is now more than seven years since the last general revision of their tariffs was made by the railroad corporations of this State. All or nearly all of them at that time were materially increased. With this no fault could then be properly found; not only had new taxes been imposed, in the collection of which the companies had been forced to assume the duties of tax-gatherers, but the cost of everything which entered into the operation of a railroad had largely risen in price, and a somewhat corresponding rise on railroad charges was an almost inevitable necessity. Within the last few years, however, the railroads have been relieved of the duty of collecting government taxes, and they have also enjoyed the advantages of a great reduction in values. The locomotive which formerly cost \$30,000, now costs but \$12,000. American rails, which, six years ago, cost \$90 per ton, now sell for between \$60 and \$70; foreign rails have fallen in price in the same proportion as gold; fuel, which, during the war, cost our companies \$12 per ton, now costs the same companies \$8; steel has even fallen more than iron, and a sensible reduction, though not so marked, perhaps, as in the instances cited, has taken place in almost every article of railroad supplies. Since the year 1860, on the other hand, the gross earnings of the railroads in Massachusetts have increased from nine to twenty-five million dollars annually, and their net earnings from less than three to considerably over six millions. The increase in the wealth and population of the Commonwealth during the same period has been equally gratifying, and that it should be continued is a matter of no less consequence to the railroad companies than to the people of the State.

As a result of very careful investigation during the last two years, we are strongly inclined to believe that Massachusetts is at this time susceptible of a very great and sudden industrial development. All the conditions essential to such a development have, for a series of years, been gradually and slowly accumulating; capital has been amassed, skill has been acquired, industries have taken root, machinery has been invented and a reputation has been acquired; it only remains to take full advantage of these circumstances to secure to the people of the State a decided and lasting preëminence among the manufacturing communities of America. What is now needed is a stimulus, which can be furnished either by removing some existing burdens of taxation or by affording industry new and cheaper facilities. Both measures of relief rest very largely in the hands of the railroad corporations of the State, and in the result they are deeply interested.

It is a perfectly well-established fact in railroad economy, that where a community is industrially in an elastic condition, ready at once to respond to any remission of burdens or improved appliances, a reduction of railroad charges within certain limits does not necessarily involve any loss of net profits to the corporations making it. The increase of business and consequent multiplication of reduced profits more than compensates for the smaller return from each transaction. So far as Massachusetts is concerned, every experiment made by the railroad corporations of the State, during the last few years, in the direction of decreased charges, has entirely confirmed this proposition. In no case has any recent reduction led to any material loss in net profit, and in several cases such experiments have been followed by a decided increase.

It is undeniable that a knowledge of these facts, and a consciousness on the part of the community at large that the corporations have been very slow and reluctant to make even the concessions which experience has shown to be safe and reasonable, have gradually excited a very considerable feeling, both in the popular mind and in the legislature. As sufficient evidence of this, and of the practical shape in the statute book which the feeling threatens to assume, we beg leave to refer you to a copy of a law which the Committee on Railways of the last legislature reported under instructions, and which was defeated on its third reading in the Senate by but a single vote, and also to two reports of leading committees of the last general court, all of which will be found appended to this communication. Both of these latter documents are so outspoken as to leave no doubt of the purpose of those who prepared them, and both of them were in many influential quarters decidedly

criticised because they confined themselves to intimations as to the future, and fell short as regards immediate action.

The present is the first year in which the new form of railroad returns are to go into use, and consequently, should any general change of railroad tariffs be made to take effect on the first of the coming October, the results of the next year would furnish an excellent test of the effect of such change, and throw much light on the course to be pursued in future.

In approaching this revision we wish to suggest a few leading principles upon which we believe it should be based. A small uniform reduction of charges throughout a railroad tariff has been generally found to be simply equivalent to a loss of so much net profit to the company making it. To be effective, and to communicate a decided industrial impetus, a heavy and concentrated reduction, which will make itself immediately felt, is necessary. The Commissioners believe that this rule is to be deduced from the experience of all countries. In making any reduction, whether in freight or fares, we would therefore suggest to you the propriety of strongly favoring certain commodities in general use along the line of your road, and, by so doing, strongly stimulate development, rather than neutralize the whole effect of any concessions you may make by dividing it among too many objects. Take for instance coal. This is a material not only in general use, but a primary raw material in all manufacturing industry. Cheap coal is cheap power; and cheap power is cheap manufacturing. A reduction of five per cent. throughout the charges of a tariff would scarcely produce an appreciable effect on the consumption of anything; a tariff, unchanged in numerous other respects, which gave a reduction of fifty per cent. on the cost of carrying coal, would at once communicate an impetus to every branch of industry dependent on power. So also of travel. A trifling average reduction will lead to no results except diminished receipts, but a heavy reduction of fares in the neighborhood of large cities will stimulate short travel to an almost unlimited extent.

The examples given will fully illustrate the meaning we wish to convey. Our desire is to impress upon you our deep sense of the importance of effecting this change tentatively,—not attempting to do everything at once and accepting results as conclusive, but concentrating relief on that point where relief is most generally needed, and where the most decided expansion may be expected to result from it. A tariff reform commenced in this way, and carried forward as fast as results will justify, would probably, in a very limited time, include every industry in the State. In effecting it the corporations would not be called upon to make any permanent

sacrifice of net profits; and a public consciousness that an honest attempt, at least, at progress was being made, would go very far to allay popular discontent. Of course very great judgment and an intimate acquaintance with local development is necessary to the proper initiation of any such measures as those now recommended. The directors and officials of each road should naturally be more familiar than any one else with the needs and projects of the territories they accommodate. They can, therefore, best judge as to how such a system of reductions should be commenced and carried forward. As one of the persons directly concerned in this way in the management of a railroad of the State, the Commissioners would most respectfully but urgently press this subject in all its bearings upon your early attention.

As we propose in the forthcoming annual report of this Board, to devote considerable space to the subject of this communication, we shall, before the 1st of October next, call upon each corporation to inform us specifically what, if any, revision of its tariffs has been made, and how recently. The answers of the several companies will be incorporated into our report, that the coming legislature may be fully and specifically informed upon this important subject. Hoping that you will judge it consistent with the interests of the company with which you are associated to effect, before that time, a thorough and careful revision of its tariffs,

We remain, &c.,

JAMES C. CONVERSE.
C. F. ADAMS, Jr.

[D.]

BOSTON, January 2, 1871.

To the Railroad Commissioners of the Commonwealth of Massachusetts.

GENTLEMEN:—I beg leave, on behalf of the Lowell Bleachery, Lawrence Manufacturing Co., Boott Cotton Mills, Massachusetts Cotton Mills, Lowell Manufacturing Co., Middlesex Company and Hamilton Manufacturing Co., to submit to your consideration the statements of the treasurer of each of these corporations, together with a letter from Mr. Willard B. Phillips, manager of the Phillips Wharf at Salem, at the terminus in that city of the Salem & Lowell Railroad, accompanied by certain carefully prepared statistics showing in detail the manner in which the business of receiving and transporting coal has been conducted by this railroad during the past two years.

The object of this communication is to call to your attention the continued neglect of the Boston & Lowell Railroad, lessees of the Salem & Lowell Railroad, to provide proper facilities for the transportation of coal from Salem to Lowell, and as results of such neglect, the large sums paid by these corporations as demurrage, the increased cost to them of coal, which in the end falls on the consumer of their manufactured product, the consequent inability of Lowell to compete in cheapness of manufacture with Fall River, Providence and other manufacturing towns, and the probable withdrawal of the coal trade from Salem, with its necessary injury to wharf property there.

Without entering on a lengthy argument, I submit the following facts:—

1. There are now from 550,000 to 600,000 spindles running at Lowell, representing about \$14,000,000 of capital, and giving employment to a large number of persons. The prosperity of the place depends upon its manufactures. The great increase of manufactures in Lowell has demanded a greater amount of power than water alone can supply. The water-power in the Merrimack is all consumed, and during the dry months is unable to keep the mills running. For this reason auxiliary steam-engines have been placed in almost all the mills, and are used to a very large extent. Not only is steam-power in constant use in many processes supplementing and auxiliary to manufacturing, but in seasons of drought is the

sole reliance of the manufacturer in keeping the organization of the mill together. The more frequent recurrence of droughts is now matter of common experience. It is clear, too, if the water-power is insufficient to-day, that, with the constant advance of our manufactures and increase in the number of spindles, it will become more and more insufficient in the future.

Coal is therefore a necessity to Lowell, and the cheaper and more expeditiously it can be delivered at the yards of her mills, the cheaper will be her goods and the greater her power of competition with other manufacturing centres. *Without water-power the prosperity of Lowell depends entirely on the price of coal.*

2. The shortest, quickest and most convenient way of bringing coal to Lowell is by delivering it from vessels into cars at deep water at Salem. The Salem & Lowell Railroad is but twenty-five miles in length, and connects with tracks directly upon the wharves. Being a branch road there is no reason for delay caused by the interference of more distant traffic.

The terminal facilities at Salem are admirable. The wharf covers over nine acres, has 2,500 feet of dock-room and a capacity of discharging fifteen vessels into cars at one time. This, at the average of only 100 tons per day to each vessel, gives a power of receiving 1,500 tons per day, or 37,500 in a month of twenty-five working days, double the quantity ever received in any month, even in the height of the coal season. The freight charged, of \$1.25 per ton, or about five cents per mile, should be, even after the deduction of the thirty cents paid at the wharf, largely remunerative, and is indeed excessive when compared with other coal freights. It has, however, been willingly paid.

In the year 1870, 75,420 tons, and in 1871, 76,372 tons, were delivered at the wharf, and transported by the railroad.

3. In spite of these large facilities and high freights, the railroad company, instead of transporting this coal with promptness, have so conducted their business as to materially increase the cost of every ton brought by them to Lowell, by a demurrage paid by the consignees, representing no value received, but simply wasted time, and enhancing the cost of every yard of manufactured fabric. Having exclusive possession of the franchise of transporting this coal, and knowing that every ton must in the end pay its freight, the company has supplied only such number of cars and at such times as it has seen fit. The result has been that, from the time when coal has begun to arrive in the spring until the cessation of the trade in

December, there has been a constant and unremitting coal blockade,—thousands of tons remaining on the vessels and the wharf awaiting transportation, and every day adding to the heavy score of demurrage. In 1870, from April 9th to December 14th, this blockade was incessant. The same was the case in 1871, from June 1st to November 29th, the date of the preparation of the table for that year, when 6,659 tons still remained to be transported. In 1870, the quantity daily delayed reached 8,644 tons, and in 1871, as high as 10,917 tons. From September 1st to November 1st, the amount was never less than 3,000 tons, and averaged nearly twice that sum; while from June 20th to November 1st, in the following year, the smallest amount on any day awaiting transportation, was 4,307 tons; for ten successive days, from October 2d to October 12th, was over 10,000 tons; and averaged nearly 7,000 tons. When it is remembered that demurrage is charged on the whole cargo until all is unloaded, and that the quantity on hand therefore but partially represents the amount on which demurrage is paid, the grossness of the abuse may be appreciated. Yet during these long periods, extending from April to December, in a traffic regular, not exceptional, with terminal facilities unexcelled, and with a remuneration high if not excessive, the railroad company made no material increase in the number of cars. As an instance of their diligence, on October 12th, 1871, with 10,249 tons of coal awaiting transportation, they carried away but 190! It may be added, that as a practical result of this, fast schooners are unwilling to take freights to Salem, for, even with the large demurrage paid them, they find the employment unprofitable through the long delay there.

The tables show that the usual number of carloads of four tons each carried per day varies from about eighty to one hundred and ten, averaging somewhat over ninety. They also disclose the fact that had the railroad seen fit to carry an average of forty more carloads per day, or on an emergency from fifty to sixty; and to keep up the supply with a fair regularity, the blockade would not have occurred. An increase of forty to fifty carloads per day is no extravagant demand to make upon a prosperous railroad company,—yet though frequently and urgently made it has always been neglected.

The average demurrage of many of the mills is from sixty to seventy cents per ton, from eight to twelve per cent. on the average cost of coal. This demurrage increases rather than diminishes, showing no attempts on the part of the railroad to remedy the evil. In the case of the Lowell Bleachery, which used the same amount of coal in 1870 as in 1871, this demurrage was nearly doubled, increasing from \$1,794.93 in 1870, to \$3,921.46 in 1871.

4. As to the remedy for these abuses.

In the language of Mr. Phillips, "there certainly is no way in which coal can be transported upon arrival, and without delay, except by an increased number of cars per day." He clearly shows how double the amount now received might easily be met by a proper increase of equipment. Pockets are unable to meet the difficulty or to accommodate the extreme amounts delayed, while they would increase the cost of every ton twenty-five cents, causing an extra hoist, besides injuring the coal through extra handling. No remedy increasing the cost of the raw material should be resorted to while another is within easy reach. This, too, would be totally ineffective without an increase of cars. Delays of certain consignees in returning cars are doubtless necessarily incidental to every traffic of this kind, and must be considered by every railroad as such, in estimating the number of cars necessary to transact the business. A penalty or increased charge easily remedies this. This delay obtains in this instance only among consignees of smaller quantities, and it appears that no delay is as a rule caused by the mills, where almost perfect arrangements for discharging coal with promptness are well known to exist. "Even if," says Mr. Phillips, "all the cars conveying coal were promptly discharged and returned, there would still be, in my judgment, a necessity for an increase of cars to be used by the railroad in this service."

It is undoubtedly true that favorable winds, or a large supply of schooners offering at the coal ports, or low freights, or all these causes in combination, may on certain days during the season produce larger arrivals than a railroad in the exercise of reasonable prudence can expect to provide for. Of demurrage caused by exigencies like these, there can be no just cause of complaint. That is not this case. This is not the case of a "fleet" unexpectedly precipitated on a railroad. Here, on the contrary, is a regular traffic, lasting during eight months of every year, with a quantity of coal not varying essentially from quantities of previous years, arriving with no greater irregularity than is incident to every commercial shipment; constituting, in short, a fixed and definite branch of business offered to a railroad; yet conducted in a manner which from the beginning to the end of the season regularly causes loss and delay to the manufacturer, increased cost to the manufactured product, and will, if persisted in, materially injure the prosperity of the largest manufacturing city in the Commonwealth.

This application is not made until other means have been exhausted. Repeated and urgent appeals have been made to the management of the road, but utterly without success.

On behalf of the corporations I represent, I would earnestly urge upon you such measures as may speedily remedy this abuse. It seems clear that legislative action is necessary, and that this is the only resource. I therefore respectfully ask that this communication may be recommended by you to the consideration of the general court at their approaching session.

It is not thought necessary in this letter to further advert to the large mass of just complaint, especially of coal dealers in Lowell, which is easily accessible. Each citizen using coal in Lowell may fairly be said to have an interest in this question. A striking letter from a single coal dealer is merely selected and appended, stating that although a cargo of 217 tons belonging to him had been landed at Salem, on the 5th of July, on the 12th of December he had not succeeded in obtaining a carload of it! But it is useless to multiply these instances. On the facts here stated, it is confidently believed that a sufficient case is presented to entitle us to early remedial legislation.

I am, very respectfully,

J. L. STACKPOLE.

RAILROAD FREIGHT STATION, PHILLIPS WHARF, }
SALEM, December 5th, 1871. }

To the Railroad Commissioners.

At your request I send you three detailed statements, showing the coal business of the Lowell Railroad at this station during those portions of the years 1870 and 1871 in which coal was delayed in its transportation.

Statement A is the daily statement for 1870 of coal received, forwarded and remaining ready for transportation between the ninth day of April, when the block first began, to the fourteenth day of December when for the first time *during a period of over eight months*, all the coal ready for transportation had been forwarded. By this statement it also appears that the largest quantity forwarded on one day was on July 29th, when 672 tons were forwarded, while on three several days, June 14, Sept. 14 and Dec. 7, only 80 tons were forwarded each day. During the nineteen* working days of April the quantity not transported reached, at the end of the month, 1,375 tons, so that 72 tons or 17 cars more per day were required. At the end of May there remained ready for trans-

* In all the statements only *working days*, that is, not including Sundays and holidays, are used.

portation only 656 tons, so that during that month the railroad transported 719 tons more than was received. During the twenty-five days of June there was an accumulation of 1,547 tons, in addition to the 656 tons remaining at the end of May, or say 62 tons or 15 cars per day, while to have carried off the whole 2,203 tons would have required 21 cars more, or 88 tons per day. During the twenty-five days of July the balance remaining on June 30 had increased to 5,785 tons, say 3,582 tons, requiring 143 tons (34 cars) more per day to be carried, while to have cleared the wharf of the 5,785 tons would have required 231.4 tons, or $54\frac{1}{2}$ cars more per day. During August (twenty-seven days) the quantity remaining was reduced from 5,785 tons to 4,190 tons, or 1,595 tons, so that the railroad transported an average of 59 tons per day (14 cars) more than was received. But to have cleared the wharf at the end of that month would have required 155 tons, or say 37 cars more per day. During September (twenty-six days) the quantity remaining to be transported had increased to 8,452 tons, or 4,262 tons during the month, which would have required 41 cars more per day, while to have cleared the wharf would have required 82 cars more per day. During October (twenty-six days) the accumulations were reduced from 8,452 tons to 4,299 tons, or 4,153 tons, which is at the rate of say 160 tons, or over 37 cars per day; but to have cleared the wharf would have required the forwarding of 165 tons, or 38 cars more per day. During November (twenty-five days) the accumulations were reduced from 4,299 tons to 1,389 tons, or 2,910 tons, which is at the rate of more than 116 tons, or nearly 28 cars per day. In the twelve days of December the wharf was easily cleared. From this statement it also appears that on June 13th the accumulations had been reduced to only 100 tons, while on 29th September they had increased to 8,644 tons, although in August the railroad had transported 1,695 tons more than had been received during that month. From the 16th August, when the accumulations were 2,942 tons, to the 29th of September (thirty-eight working days) when they had reached 8,644 tons, an increase of 5,702 tons, which would have required over 35 cars more per day, to have carried it. The largest quantity arriving in one day in 1870 was 2,898 tons.

Statement B is the daily statement for 1871 of coal received, forwarded and remaining to be transported from June 1, when the block first began, to the 30th November, on which day there remained, ready for transportation, 6,659 tons. During this year, the largest quantity forwarded in one day was 650 tons on July 6th, while the smallest quantity was 190 tons, on October 12th. During the twenty-six working days in June, the receipts in excess of trans-

portation reached 6,109 tons, an average of nearly 235 tons, or nearly 56 cars per day, which would have been required to clear the wharf. During the twenty-five days of July these accumulations had increased to 8,818 tons, or 2,709 tons more than in June. To have prevented increased accumulation would have required nearly 26 cars more per day, while to have cleared off the whole 8,818 tons would have required 83 cars more per day. During the twenty-seven days of August the railroad carried 4,171 tons more than were received, and reduced the accumulation to 4,647 tons. In carrying the 4,171 tons the railroad furnished an average of over 36 cars per day more than the receipts required, but to have cleared the wharf at the end of the month would have required over 40 cars more per day. During the twenty-six days of September the accumulations had increased from 4,647 tons to 9,723 tons, say 5,076 tons, to have carried which would have required an increase of nearly 46 cars per day, while to have cleared the wharf during the month would have required 88 cars more per day than were furnished. During October (twenty-six days) the railroad reduced the accumulation from 9,723 tons to 6,581 tons, or 3,142 tons, thus furnishing an average of over 28 cars more per day than the receipts required, but to have cleared the wharf would have required nearly 60 cars more per day than were furnished. During November (twenty-five days) the accumulations were increased 78 tons, so that there remained on the last day of the month 6,659 tons, to have carried which would have required over 62 cars per day in addition to those furnished.

This statement further shows that the accumulations were reduced on 10th June to 131 tons, the lowest point, while on 6th October they had reached 10,917 tons, the highest point, although during August the railroad had carried 4,171 tons more than were received during that month. From the 5th September, when the accumulations were reduced to 4,307 tons, to the 6th of October, when they had reached 10,917 tons, the excess in receipts over quantity transported was 6,610 tons, to have carried which in these twenty-seven working days would have required an increase of 58 cars per day. The largest quantity of coal arriving in one day, in 1871, was 2,950 tons.

Statement C shows the number of tons received and forwarded each month, the average number of tons received each day of each month, the average number of tons forwarded each day of each month, and the number of tons remaining ready to be transported at the close of each month, during the continuance of the block in 1870, and to November 30th, in 1871.

From this statement it appears that 75,530 tons were received during eight months and five days of 1870, and that 68,770 tons were received during six months of 1871. The largest monthly receipt in 1870 was 14,386 tons, and the largest monthly receipt in 1871 was 15,507 tons. The largest receipt for two months (June and July) in 1870 was 25,136 tons, while in 1871, for the same two months, the receipts were 29,101 tons. For the four months from June 1st to October 1st the receipts in 1870 were 48,185 tons, and in 1871, 52,675 tons, an average increase of only $43\frac{1}{2}$ tons per day, requiring only 10 cars more per day to transport it. The largest monthly transportation, in August of each year, was 10,837 tons, in 1870, and 12,525 tons in 1871. The largest quantity transported in two consecutive months was in July and August of each year, in 1870, 21,641 tons, and in 1871, 23,410 tons. The quantity transported during the four months of each year from June 1st to October 1st, was in 1870, 40,139, tons (8,046 less than received), and in 1871, 42,952 tons (9,723 tons less than received), thus showing an increased capacity for transportation of 2,813 tons in one hundred and four working days, or 27 tons per day, or a trifle over 6 cars per day.

July, 1870, shows an average daily receipt of $575\frac{1}{5}$ tons, while June, 1871, shows an average daily receipt of $596\frac{1}{6}$ tons. In July, 1870,—largest for that year,—the railroad transported an average of $432\frac{4}{5}$ tons per day, while in August, 1871,—largest for that year,—it transported $463\frac{3}{4}$ tons per day, showing an increase of equipment equal to $7\frac{1}{2}$ cars per day. The smallest daily average in 1870, between June and October, was in 1870, in June, $358\frac{3}{5}$ tons; and in 1871, also in June, $361\frac{1}{8}$ tons.

In 1870, for the six months ending November 30th, the railroad transported 57,563 tons, while during the same period of 1871, it carried 62,111 tons, or 4,548 tons more, which is, say, $29\frac{1}{3}$ tons per day, thus showing an increased equipment of nearly seven cars per day.

An examination of this statement shows a great discrepancy in the number of cars furnished from day to day during the several months. Thus, in 1870, $432\frac{4}{5}$ tons (nearly 102 cars) were transported on an average every day during the month of July, while in December, only $179\frac{3}{2}$ tons (only 42 cars) were transported each day. Had the 102 cars been furnished every day from the middle of June until the block was removed, the complaints would have been much fewer in number. So, in 1871, an average of $463\frac{3}{4}$ tons was carried on each day of August, say 109 cars per day, while in November, a daily average of only $325\frac{3}{8}$ tons, or only $76\frac{1}{2}$ cars

per day. Had 109 cars been furnished every day from the 1st of June, the block would have been much less annoying, and very much money which has been paid for demurrage would have been saved.

The quantity transported from June 1st to November 30th, inclusive, in 1871, averaged $400\frac{7}{10}$ tons per working day; while, during the block of 1870, an average of only $363\frac{17}{10}$ tons was carried, an increase of 37 tons per day, or nearly nine cars per day, in 1871.

So far, I have only considered how the block could have been removed by an extra number of cars. Is there any other cause for the delay, or any other way, except increase of cars, by which the heavy demurrage can be saved? There certainly is no way by which the coal can be transported upon arrival and without delay except by an increased number of cars per day. The first question will be, Are the terminal facilities sufficient? To this the answer is, that there are over 2,500 feet of dock-room at the wharf, where fifteen vessels can be discharged directly into the cars at one time, and all the time. An average of only one hundred tons per day from each vessel would make 1,500 tons per day; or say 37,500 tons per month of twenty-five working days, which is more than double the quantity ever received in one month for the Lowell road, but no greater quantity than has been landed at the wharf every day for forty consecutive days. It is not, then, a want of room at the wharf, which covers nearly nine acres. But it will be said that if 1,500 tons, say 350 cars, were loaded each day, they could not be moved upon the wharf and carried away. To this the answer would be, that they could not if the whole number were brought in at one time, as now, but that if the cars were brought to the wharf in trains of eighty to ninety cars, four times per day, there would be no difficulty.

Would not the erection of pockets help to save the demurrage? They would, but necessarily at a very great increase in wharf charges. The difficulty in using pockets is this: there are one hundred and twenty-five different consignees of coal arriving at this wharf. Each consignee averages about five varieties—the retailers more, the manufacturers less. Each consignee wishes not only each cargo, but each variety (sometimes four) in each cargo kept by itself. Now, coal measures about forty cubic feet to the ton weight. A row of pockets, twenty feet wide, filled ten feet high for the whole dock-length of the wharf, would hold only 12,500 tons, if filled, and would cost about \$75,000. This row of pockets would not nearly have held the 10,917 tons which were waiting for transportation over the Lowell road on

6th of October, 1871, because that quantity embraced many varieties belonging to many consignees. The pockets are subject to great wear and tear, and would require constant repairs and entire renewal every ten years, so that \$15,000 per year, twenty per cent., should be allowed for them, which would be about twenty cents per ton, besides the extra hoist, which would cost, say five cents per ton more, making the whole extra cost on 75,000 tons, 25 cents per ton, or \$18,750 per year, a greater sum than has been paid for demurrage.

But pockets would save much time to the railroad corporation, for a train of fifty cars could be loaded in less than two hours, thus returning the cars all loaded on the same day instead of on the next day, as now. And more than this: a vessel now reaching her dock is entitled to her turn in discharging, and can claim to be fully discharged before another vessel is commenced upon. From a sailing vessel, by the terms of the bill of lading, and to save demurrage, one hundred tons per day must be discharged, and it must be discharged into cars, unless an expense of landing upon wharf and reloading is incurred. And in doing this it frequently happens that more coal is sent to a consignee than he can receive, so that cars are not promptly unloaded, but are kept another day, and sometimes two or three, if the cargo discharging is large and the ability to receive, small. In such a case as this, the whole cargo could be put in the pockets and only such quantity as the consignee could handle daily need be sent to him. The detention of cars by consignees is no trifling matter. I have known cars to be kept by consignee for more than a fortnight, owing to large receipts by vessel, and small conveniences for unloading, and I have known one consignee who receives only six hundred tons per year, to have the whole quantity alongside the wharf at one time, while his ability to receive was limited to a few teams per day, with a long haul and no chance to dump the coal. And yet this consignee complained because he had to pay demurrage, forgetting the loss caused by him to the railroad through detention of cars, and the heavy demurrage caused to the consignees by other vessels next in turn to his. For such cases as these pockets would be of great service.

And there is still another way in which pockets would be of great service. If all coal is discharged directly into the pockets there would be no delays in shifting cars out and in, but the discharging could go on continuously, thus increasing the quantity discharged very materially, and of course delaying the vessel less time.

But an increase of one hundred cars by the railroad would cost

less money than the pockets, and would as effectually relieve the consignees, who must, in their turn, be persuaded or compelled to unload their cars more quickly and to return them more promptly.

But yet, even if all the cars carrying coal were promptly discharged and returned by the consignees, there would still be, in my judgment, a necessity for an increase in the number of cars to be used by the railroad company in this service.

One great cause of demurrage is the large arrival to one consignee—frequently from several shippers—at one time. During the present season one consignee had at one time fourteen cargoes alongside the wharf, and another consignee has had at one time 4,500 tons at the wharf. These large receipts came by sailing vessels, because steamers require about 250 tons to be discharged each day, with a heavier demurrage on a larger cargo in case of detention, so that it is for the interest neither of the consignees to receive coal by steamers, unless at a greatly reduced rate of freight, nor of the railroads to do so, until they can supply themselves with an equipment sufficient to receive the steamers' cargoes within the requirements of the bill of lading.

While coal continues to be brought by sailing vessels they will arrive in fleets, and fleets of vessels cannot be discharged by any railroad corporation so that no demurrage will be incurred, even if all the consignees are prompt in returning cars.

In conclusion, I should suggest as one remedy against demurrage, regular weekly shipments during the season for each consignee, and such arrangement for receiving coal as will enable each to take care of all the coal consigned to him and arriving at one time without any delay of cars; and, as another remedy, for the railroad so to increase its equipment as to be able to carry during each day of the six months' coal season at least 600 tons per day, and in an emergency 700 tons per day, and the erection of pockets to hold 5,000 tons, or more.

Yours, respectfully,

WILL'D P. PHILLIPS.

ccxxxiv RAILROAD COMMISSIONERS' REPORT. [Jan.

(A.)—STATEMENT of Coal Received and Forwarded to Lowell, at Phillips Wharf, Salem, in 1870.

Date.	Tons Received.	Tons Forwarded.	Tons Remaining.	Date.	Tons Received.	Tons Forwarded.	Tons Remaining.
Apr. 9,	589	102	487	June 6,	1,266	338	2,191
11,	1,348	213	1,622	7,	-	430	1,761
12,	-	195	1,427	8,	-	510	1,251
13,	-	315	1,112	9,	-	450	801
14,	-	233	879	10,	200	523	478
15,	1,767	276	2,370	11,	-	285	193
17,	-	400	1,970	13,	-	93	100
18,	-	395	1,575	14,	373	80	393
19,	-	459	1,116	16,	1,348	234	1,507
20,	-	438	678	17,	251	425	1,333
21,	-	306	372	18,	922	450	1,805
22,	-	85	287	20,	2,204	192	3,817
23,	461	-	748	21,	-	450	3,367
25,	840	298	1,290	22,	436	360	3,443
26,	289	300	1,279	23,	-	242	3,201
27,	998	298	1,979	24,	1,116	556	3,761
28,	620	425	2,174	25,	-	416	3,345
29,	-	510	1,664	27,	-	391	2,954
30,	200	489	1,375	28,	-	520	2,434
May 2,	1,311	450	2,236	29,	-	180	2,254
3,	997	400	2,833	30,	459	510	2,203
4,	-	425	2,408	July 1,	419	425	2,197
5,	-	345	2,063	2,	-	450	1,747
6,	-	472	1,591	5,	364	442	1,669
7,	379	238	1,732	7,	2,323	298	3,694
9,	-	484	1,248	8,	750	540	3,904
10,	-	174	1,074	9,	-	344	3,560
11,	-	425	649	11,	2,898	370	6,088
12,	-	276	373	12,	1,241	660	6,669
13,	256	272	357	14,	365	425	6,609
14,	310	212	455	15,	1,760	460	7,909
16,	1,688	230	1,913	16,	323	465	7,767
17,	-	187	1,726	18,	184	468	7,483
18,	-	425	1,301	19,	-	464	7,019
19,	1,017	324	1,994	20,	513	442	7,090
20,	601	332	2,263	21,	-	285	6,805
21,	549	498	2,314	22,	-	489	6,316
23,	256	361	2,209	23,	227	523	6,020
24,	700	425	2,484	25,	2,224	498	7,746
25,	380	425	2,439	26,	410	574	7,582
26,	381	531	2,289	27,	-	638	6,944
27,	285	400	2,174	28,	-	382	6,562
28,	-	485	1,689	29,	-	672	5,890
30,	-	531	1,158	30,	385	490	5,785
31,	-	502	656	Aug. 1,	-	595	5,190
June 1,	-	250	406	2,	967	510	5,647
2,	1,698	276	1,828	3,	-	510	5,137
3,	477	502	1,803	4,	-	446	4,691
4,	-	540	1,263	5,	-	390	4,301

(A.)—STATEMENT of Coal Received and Forwarded—Continued.

Date.	Tons Received.	Tons Forwarded.	Tons Remaining.	Date.	Tons Received.	Tons Forwarded.	Tons Remaining.
Aug. 6,	262	450	4,113	Oct. 5,	—	315	7,709
8,	416	410	4,119	6,	117	250	7,576
9,	—	455	3,664	7,	—	360	7,216
10,	895	268	4,291	8,	—	410	6,806
11,	—	450	3,841	10,	—	230	6,576
12,	—	275	3,566	11,	285	630	6,231
13,	657	476	3,747	12,	197	190	6,238
15,	—	515	3,232	13,	520	325	6,433
16,	—	290	2,942	14,	531	370	6,594
17,	1,392	468	3,866	15,	1,394	405	7,583
18,	—	472	3,394	17,	1,021	375	8,229
19,	988	238	4,144	18,	—	385	7,844
20,	355	408	4,090	19,	—	235	7,609
22,	502	355	4,238	20,	—	302	7,307
23,	—	450	3,788	21,	—	390	6,917
24,	—	404	3,384	22,	—	405	6,512
25,	—	408	2,976	24,	—	375	6,137
26,	—	385	2,591	25,	530	390	6,277
27,	230	265	2,556	26,	—	455	5,822
29,	1,934	260	4,230	27,	—	438	5,384
30,	644	438	4,436	28,	—	275	5,109
31,	—	246	4,190	29,	—	425	4,684
Sept. 1,	748	350	4,588	31,	—	385	4,299
2,	—	438	4,150	Nov. 1,	—	455	3,844
3,	—	404	3,746	2,	507	445	3,906
5,	—	412	3,334	3,	926	315	4,517
6,	614	434	3,514	4,	—	290	4,227
7,	275	460	3,329	5,	—	445	3,782
8,	1,685	246	4,768	7,	—	450	3,332
9,	—	438	4,330	8,	—	295	3,037
10,	998	330	4,998	9,	315	490	2,862
12,	762	455	5,305	10,	—	290	2,572
13,	—	250	5,055	11,	—	260	2,312
14,	—	80	4,975	12,	—	295	2,017
15,	1,191	412	5,754	14,	—	320	1,697
16,	401	102	6,053	15,	455	265	1,887
17,	1,650	312	7,391	16,	—	184	1,703
19,	—	480	6,911	17,	680	345	2,038
20,	—	408	6,503	18,	—	230	1,808
21,	—	404	6,099	19,	375	250	1,933
22,	645	442	6,302	21,	—	320	1,613
23,	—	242	6,060	22,	591	290	1,914
24,	—	476	5,584	23,	305	195	2,024
26,	1,525	450	6,659	25,	292	340	1,976
27,	647	215	7,091	26,	—	320	1,656
28,	1,796	465	8,422	28,	—	415	1,241
29,	602	380	8,644	29,	658	240	1,659
30,	268	460	8,452	30,	—	270	1,389
Oct. 1,	—	345	8,107	Dec. 1,	—	270	1,119
3,	662	405	8,364	2,	210	290	1,039
4,	—	340	8,024	3,	—	270	769

CCXXXVI RAILROAD COMMISSIONERS' REPORT. [Jan.

(A.)—STATEMENT of Coal Received and Forwarded—Continued.

Date.	Tons Received.	Tons Forwarded.	Tons Remaining.	Date.	Tons Received.	Tons Forwarded.	Tons Remaining.
Dec. 5,	—	215	554	Dec. 12,	—	260	246
6,	—	210	344	14,	—	246	—
7,	182	80	446				
8,	370	85	731		75,530	75,530	
9,	—	225	506				

(B.)—STATEMENT of Coal Received and Forwarded to Lowell in 1871, at Phillips Wharf, Salem.

June 1,	353	225	128	July 15,	796	640	7,588
2,	727	225	630	17,	194	390	7,392
3,	178	234	574	18,	435	245	7,582
5,	965	225	1,314	19,	1,081	420	8,243
6,	—	335	979	20,	—	420	7,823
7,	289	330	938	21,	387	420	7,790
8,	—	380	558	22,	—	425	7,365
9,	—	425	133	24,	1,480	390	8,455
10,	333	335	131	25,	1,240	450	9,245
12,	742	400	473	26,	—	195	9,050
13,	491	340	624	27,	503	320	9,233
14,	2,650	245	3,029	28,	560	425	9,368
15,	1,010	440	3,599	29,	400	450	9,318
16,	388	328	3,659	31,	—	500	8,818
17,	322	325	3,656	Aug. 1,	—	450	8,368
19,	1,760	230	5,186	2,	—	480	7,888
20,	478	435	5,229	3,	—	520	7,368
21,	1,727	400	6,556	4,	313	630	7,051
22,	—	486	6,070	5,	—	480	6,571
23,	1,802	425	7,447	7,	1,609	460	7,720
24,	225	425	7,247	8,	1,410	425	8,705
26,	226	480	6,993	9,	—	430	8,275
27,	—	420	6,573	10,	—	495	7,780
28,	741	360	6,954	11,	—	420	7,360
29,	—	470	6,484	12,	216	445	7,131
30,	100	475	6,109	14,	932	475	7,588
July 1,	807	450	6,466	15,	—	430	7,158
3,	775	470	6,771	16,	426	370	7,214
5,	1,012	545	7,238	17,	429	480	7,163
6,	623	650	7,211	18,	—	440	6,723
7,	370	630	6,951	19,	—	470	6,253
8,	336	430	6,857	21,	312	470	6,095
10,	2,180	450	8,587	22,	—	475	5,620
11,	—	400	8,187	23,	1,027	475	6,172
12,	—	420	7,767	24,	—	445	5,727
13,	—	330	7,437	25,	—	450	5,277
14,	415	420	7,432	26,	352	420	5,209

(B.)—STATEMENT of Coal Received and Forwarded—Concluded.

Date.	Tons Received.	Tons Forwarded.	Tons Re- maining.	Date.	Tons Received.	Tons Forwarded.	Tons Re- maining.
Aug. 28,	1,058	515	5,752	Oct. 14,	—	410	9,199
29,	270	420	5,602	16,	564	340	9,423
30,	—	455	5,147	17,	—	510	8,913
31,	—	500	4,647	18,	—	450	8,463
Sept. 1,	1,085	464	5,268	19,	—	450	8,013
2,	207	425	5,050	20,	—	430	7,583
4,	—	465	4,585	21,	—	425	7,158
5,	212	490	4,307	23,	557	470	7,245
6,	568	490	4,385	24,	763	430	7,578
7,	1,431	255	5,561	25,	—	390	7,188
8,	120	250	5,431	26,	—	468	6,720
9,	—	460	4,971	27,	—	425	6,295
11,	1,228	390	5,809	28,	—	405	5,890
12,	—	380	5,429	30,	—	320	5,570
13,	255	405	5,279	31,	1,348	337	6,581
14,	815	470	5,624	Nov. 1,	571	445	6,707
15,	—	440	5,184	2,	—	425	6,282
16,	190	265	5,109	3,	—	425	5,857
18,	—	270	4,839	4,	—	445	5,412
19,	2,950	460	7,329	6,	—	380	5,032
20,	1,044	450	7,923	7,	—	490	4,542
21,	—	350	7,573	8,	—	365	4,177
22,	—	385	7,188	9,	—	435	3,742
23,	—	390	6,798	10,	—	315	3,427
25,	1,942	355	8,385	11,	481	245	3,663
26,	630	325	8,690	13,	—	225	3,438
27,	—	360	8,330	14,	1,030	225	4,243
28,	—	285	8,045	17,	247	405	4,085
29,	2,543	425	10,163	18,	—	414	3,671
30,	—	440	9,723	20,	1,283	425	4,529
Oct. 2,	1,246	450	10,519	21,	2,451	245	6,735
3,	401	455	10,465	22,	—	385	6,350
4,	—	450	10,015	23,	277	280	6,347
5,	1,060	480	10,595	24,	785	250	6,882
6,	747	425	10,917	25,	—	365	6,517
7,	—	450	10,467	27,	1,102	375	7,244
9,	440	445	10,462	28,	—	360	6,884
10,	562	525	10,499	29,	—	225	6,659
11,	180	430	10,249				
12,	—	190	10,059				
13,	—	450	9,609				
					68,770	62,111	

ccxxxviii RAILROAD COMMISSIONERS' REPORT. [Jan.

(C).—STATEMENT of Coal received each day of each month during the continuance of the block in 1870-71.

1870.	Number of Tons Received.	Number of Tons Forwarded.	Average num- ber of Tons received per day.	Average num- ber of Tons forwarded per day.	Number of Tons re- maining at the end of the month.
April 9th, . . .	7,112	5,737	$374\frac{6}{19}$	$302\frac{1}{19}$	1,375
May, . . .	9,110	10,079	$350\frac{10}{26}$	$387\frac{17}{26}$	656
June, . . .	10,750	8,953	430	$358\frac{8}{26}$	2,203
July . . .	14,386	10,804	$575\frac{11}{25}$	$432\frac{4}{25}$	5,785
August, . . .	9,242	10,837	$342\frac{3}{27}$	$401\frac{0}{27}$	4,190
September, . . .	13,807	9,545	$531\frac{1}{26}$	$367\frac{3}{26}$	8,452
October, . . .	5,257	9,420	$202\frac{1}{26}$	$362\frac{8}{26}$	4,299
November, . . .	5,104	8,004	$204\frac{4}{25}$	$320\frac{4}{25}$	1,389
December, . . .	762	2,151	$63\frac{6}{12}$	$179\frac{8}{12}$	Closed Dec. 14th.
	75,530	75,530	Average $363\frac{17}{100}$ per day.		
1871.					
June, . . .	15,507	9,398	$596\frac{11}{26}$	$361\frac{2}{26}$	6,109
July, . . .	13,594	10,885	$543\frac{19}{25}$	$435\frac{9}{25}$	8,818
August, . . .	8,354	12,525	$309\frac{11}{27}$	$463\frac{3}{27}$	4,647
September, . . .	15,220	10,144	$585\frac{10}{26}$	$390\frac{4}{26}$	9,723
October, . . .	7,868	11,010	$302\frac{18}{26}$	$423\frac{2}{26}$	6,581
November, . . .	8,227	8,149	$329\frac{2}{25}$	$325\frac{4}{25}$	6,659
	68,770	62,111	Average $400\frac{7}{100}$ per day.		

The following questions were issued in a circular from this office, and addressed to various corporations, firms and individuals engaged in manufacturing. The numbers prefixed to the subjoined answers indicate the questions to which they are in reply:—

1. State name and style of firm, &c., place and nature of business.
2. In manufacturing do you make use of coal or water power?
3. From whence do you bring the coal you use, and how many miles of land-carriage does it bear, and over what railroads?
4. How many tons do you consume annually, and how much, during the last two years, has coal cost you in gross and per ton?
5. What has been the charge for its carriage per ton per mile from tide-water to place of consumption?
6. Have you experienced any delays or loss from demurrage?
7. How far, if at all, would a reduction of 33 per cent. in railroad charges for carriage of coal affect your ability to manufacture, in competition with other points out of the State, or upon the seaboard?
8. State what leading raw materials you use in manufacturing, and from whence they come, in what quantities, and at what railroad tariff rates.
9. How much freight on raw materials, including coal, do you annually pay to railroad companies?
10. State what, in your judgment, would be the effect upon your business of any considerable reduction in the cost of transporting these raw materials?
11. Make any additional statement pertinent to this inquiry which may seem to you to throw light upon it.

Lawrence Manufacturing Company.

BOSTON, November 18th, 1871.

1. Lawrence Manufacturing Company; cotton cloth and hosiery.
2. Both.
3. Philadelphia; 24 miles land-carriage; Salem and Lowell Railroad.
4. 2,500 tons annually; \$49,814.88 in two years; \$8.41 per ton.
5. 5.2083½ cents per ton per mile (Salem to Lowell).
6. We have met with frequent delays. The railroad has sometimes taken two months to transport coal from Salem to Lowell. From October, 1870, to October, 1871, we paid an

average of 65 cents per ton for demurrage on 3,626 tons of coal.

7. It would be very important.
8. Use about 11,000 bales of cotton from Southern States, and 2,500 tons coal. The tariff rates vary according to distance.
9. Paid railroad freight on cotton, coal and other raw materials during the last two years, \$60,305.85; or, annually, \$30,152.92. Paid vessels during the same period, \$63,936.60; or, annually, \$31,968.30.
10. As all our raw material has to be transported great distances, the cost of this transportation is of the most vital importance, to enable us to compete with mills more favorably situated.
11. Lowell has now 550,000 to 600,000 spindles running. All the water power in the Merrimack is used up, and more than used during dry months, and auxiliary steam-engines have been placed in almost all the mills, to keep the organization together during times of drouth, by running the mills at speed. Of course, without water-power, the future growth and prosperity of the place depend *entirely on the price of coal*. If we are subjected to heavy charges for freight, to excessive demurrage and to long delays in transportation, we cannot compete with any manufacturing corporation who may be situated on the seaboard, or may obtain their coal through the benefit of railroad competition, on more favorable terms. I think the price of coal has alone enabled Fall River to outstrip Lowell. To my knowledge there has been no detention of cars at the mill at Lowell, as we have ample facilities for receiving the coal.

T. JEFFERSON COOLIDGE,
Treasurer Lawrence Manuf. Co.

Lowell Manufacturing Company.

LOWELL, November 25, 1871.

1. Lowell Manufacturing Company; Lowell, Massachusetts; manufacture carpets and lastings.
2. Steam and water-power.
3. Landed at Salem and Boston, and received by Salem & Lowell, and Boston & Lowell railroads, each about 26 miles long.
4. Use about 5,000 tons; in 1869 and 1870 bought 10,437 tons, costing \$99,643.68, averaging \$9.55 per ton.

5. Present price, \$1.25 per ton for 26 miles.
6. We have.
7. Would save us about \$2,300 per annum.
8. Wool principally; some cotton, in all about 6,000,000 lbs.; freight from New York, 30 cents per hundred; Boston, \$2.00 and \$2.20 per ton.
9. About \$15,000, exclusive of freight on general supplies and manufactured goods.
10. It would enable us to compete more successfully with those manufacturing elsewhere.
11. In 1869 paid only \$83.20 demurrage. In 1870 we paid \$1,312.60 demurrage, equal to 28.97 cents per ton, a sum which would purchase three first-class coal-cars, with which 15 tons coal per day could be transported.

SAMUEL FAY, *Sup't Lowell Manuf. Co.*

Hamilton Manufacturing Company.

1. Hamilton Manufacturing Company; Lowell; cotton and wool, and print works.
2. Both.
3. From Salem, 24 miles; and from Boston, 26 miles.
4. From 5,000 to 6,000 tons annually; for past two years gross cost has been \$76,285.74; averaging \$8.62 per ton.
5. \$1.25 per ton.
6. In 1871, thus far, have paid \$776.56 on 1,278 tons; total amount, \$1,775.59 for year 1871.
7. Have not data enough to reply to this enquiry.
8. The variety of raw materials used, and the great number of places from which they are shipped, would require tables for which we have no time to make up.
9. Over \$33,500.
- 10, 11. Lowell has utilized most of her water-power. A considerable reduction in coal freights would enable her to increase the steam-power in effective competition with the seaboard. Then the transportation of coal, cotton, wool and dyestuffs and passengers would be increased. The net profits of the railways themselves would be increased. There has been no detention of coal-cars by the Hamilton Manufacturing Company; they have always been discharged without delay.

JAS. A. DUPEE,

Treasurer Hamilton Manuf. Co.

Lowell Bleachery.

BOSTON, November 27, 1871.

1. Lowell Bleachery ; Lowell.
2. Coal for power.
3. 26 miles, over Boston & Lowell, and Salem & Lowell Railroad.
4. About 6,000 tons for 1870, and about the same quantity for 1871.
5. \$1.25 for 26 miles.
6. Yes.
11. In 1870 we paid for demurrage, \$1,794.93 ; in 1871, \$3,921.46. Our coal, including demurrage, cost us over \$8 per ton, the demurrage per ton being about 63 cents per ton on our annual supply for 1871. Say, transportation to Lowell, \$1.25 ; demurrage, 63 cents,—\$1.88 per ton. We have paid, during the last two years, for railroad transportation, over ten per centum of our gross receipts. We have the amplest facilities at the works for the receipt and prompt discharge of coal, and cars are therefore not detained.

S. G. SNELLING,
Treasurer Lowell Bleachery.

Massachusetts Cotton Mills.

LOWELL, December 23, 1871.

1. Massachusetts Cotton Mills ; Lowell.
2. Principally water-power.
3. Principally from Philadelphia ; about 24 miles land-carriage, over Salem & Lowell Railroad.
4. About 1,300 tons ; gross cost in two years, \$33,351.24, at \$8.66 per ton at mill.
5. About 5½ cents.
6. Loss of \$910.40 for past year.
8. Cotton and coal ; cotton from Boston and from Southern ports or places, at rates varying from \$2 per ton to \$1.35 per 100 lbs. Coal as stated above. The \$2 per ton is on cotton from Boston. The freight on cotton from Selma, Memphis, &c., varies from \$1.10 to \$1.35 per 100 lbs.
9. About \$30,000. The amount would vary annually, dependent upon the places from which the cotton was received.

HOMER BARTLETT,
Treasurer Mass. Cotton Mills.

The coal-cars have been promptly returned to the road on the same day they have come to us.

F. F. BATTLES, *Agent*.

Boott Cotton Mills.

BOSTON, November 18, 1871.

1. Boott Cotton Mills ; Lowell.
2. Principally water-power.
3. Principally from Philadelphia ; about 24 miles land-carriage over Salem & Lowell Railroad.
4. About 1,500 tons ; gross cost in two years, \$27,719.70, at \$8.63 per ton at mill.
5. About $5\frac{1}{2}$ cents.
6. Loss of \$922.88 for past year.
8. Cotton and coal ; cotton from Boston at \$2 per ton, and from Southern ports or places at rates varying from \$1.10 to \$1.35 per hundred.
9. About \$15,000. This amount would vary annually, dependent upon the places from which the cotton was received.
11. Our facilities for receipt and prompt discharge of coal are of the amplest kind, and cars are not therefore detained at our mills.

RICH'D D. ROGERS,
Treasurer Boott Cotton Mills.

Middlesex Company.

1. Middlesex Company ; Lowell ; manufacturing woollen goods.
2. Water-power, with steam from coal as an occasional auxiliary. Coal is used also in heating and dyeing.
3. New York and Boston ; 26 miles ; Boston, Lowell & Nashua Railroad. Philadelphia via Salem ; 24 miles ; Salem & Lowell Railroad.
4. 2,004 tons ; \$37,892 ; \$9.45.
5. $4\frac{8}{10}$ cents.
6. During the past two years we have paid for demurrage, \$192.48.
7. Our ability to manufacture would be effected in exact proportion to the reduction in railroad charges. This company has a surplus of water-power, and cheaper coal would probably not induce us to increase our works. It would diminish

our expenses of manufacturing, and thereby give us a better chance to compete with mills situated nearer to their coal, and with foreign goods manufactured under extremely favorable conditions as to power and fuel.

8. Wool; Boston,—American, 1,255,342 lbs., 11 cents per 100 lbs.; foreign, 188,833, 10 cents per 100 lbs. Coal; Boston and Salem; average, 2,004 tons; \$1.25 per ton. Dyestuffs; Boston; 117,400 lbs; 11 cents per 100 lbs. Glue; Boston; 7,850 lbs; 10 cents per 100 lbs. Soap stock (potash and red oil); Boston; 294,200 lbs.; 11 cents per 100 lbs. Lard oils; Boston; 7,022 gals. or 63,200 lbs.; 11 cents per 100 lbs. Teazles, New York State via Worcester; 151,600 lbs.; 25 cents per 100 lbs.
9. \$13,974.43.
10. I would add, a considerable reduction on all our raw materials would be of much more benefit than a proportionate reduction on any one of them. Woollen manufacturing has been, since the war, so close a business, that high freights have had their effect in preventing us from making various styles of coarse and bulky goods, and facility in varying our styles of goods, and passing from fine to coarse, or light to heavy, as the market demands, is the very life of our business.
11. In consequence of the various delays in discharging at Salem or Boston, we have of late years bought our coal almost exclusively in New York. Vessels from that port have no demurrage clause in their bills of lading, and the risk of delay falls upon them. Of course this risk is considered in the rate of freight paid; but we prefer to pay it rather than run the chance of the enormous demurrage charged by some of the vessels from Philadelphia. In several cases in the last three years, the loss to the vessels bringing coal has been so great that I have made them an allowance of their actual expenses after a week's delay. I would suggest that evidence should be taken from owners and masters of colliers, upon the subject of this inquiry. The delay to coal does not cease upon its discharge upon the wharf at Salem. For want of cars and facilities for handling, it is often several weeks, sometimes three or four months after landing, before the coal is received in the company's yard in Lowell. To enforce courtesy and an accommodating spirit is not, perhaps, within the power of legislation, but the rough contempt with which all complaints of delay and claims for damage are received by the Boston & Lowell railroad and its

branches, would seem to suggest the inquiry, whether penalties or forfeiture of a proportion of freight-money may not with advantage be imposed by law for unreasonable delay, and railroads be held to a stricter account for damage to merchandise. Although much dissatisfaction is felt by the corporations established in Lowell, with the rates of freight and manner of performing the service on the Boston & Lowell railroad, I do not think that the strongest arguments against them are to be drawn from the experience of the mills upon the water-power of the locks and canals. Lowell is a centre for skilled labor, and has many of the conditions to make it a very important manufacturing town, could it obtain steam-power at rates more nearly equal to those at other places, as Providence, Fall River, &c. At present, the growth of its manufactures is practically limited by the amount of power to be derived from the Merrimack and Concord Rivers. This argument is too obvious to require development by me.

RICHARD S. FAY,

Treasurer of the Middlesex Co.

LOWELL, MASS., December 12, 1871.

J. L. STACKPOLE, Esq.

DEAR SIR:—Your favor requesting amount of demurrage paid by me this season, is received.

My demurrage since June, 1871, amounts to \$1,554 $\frac{40}{100}$ on ten cargoes of coal.

It has been with much difficulty I could get coal over the road. I have one cargo, 217 tons coal, which was landed on the wharf at Salem the 5th of July last, from which I have been unable to get even a single carload of coal. Exposed as it is to rain, snow and cold, freezing weather, the probabilities are, the coal will stay there till a January thaw, or the opening of the spring.

Truly yours,

WM. KITTREDGE.

[E.] Tabular Statement of Accidents reported to the Railroad Commissioners for the Year ending Sept. 30, 1871.

RAILROADS.	Whole Number In- jured.	Passengers.	Employees.	At Crossings and Stations.	Unlawfully or care- lessly on track or cars.	Children.	Adults.	Fatal.	Not Fatal.	PASSENGERS.				EMPLOYEES.				
										In the Cars.	Jumping on or off.	Fatal.	Not Fatal.	On Train.	Other Em- ployes.	Coupling Cars.	Falling from Train.	Struck by Bridge.
Boston & Albany,	45	2	20	6	17	2	43	45	-	-	2	2	-	13	47	5	4	-
Boston, Clinton & Fitchburg,*	1	-	-	-	1	-	1	1	-	-	-	1	-	-	-	-	-	-
Boston, Hartford & Erie,*	26	26	-	-	1	-	26	1	25	26	-	1	-	-	-	-	-	-
Boston & Lowell,*	16	2	6	1	7	2	14	12	4	-	-	2	-	3	3	2	1	-
Boston & Maine,*	10	3	1	2	4	1	9	9	1	-	3	2	1	1	1	1	-	-
Boston & Providence,*	2	1	-	-	1	-	2	2	-	-	1	1	-	-	-	-	-	-
Cheshire,	4	-	3	1	-	-	4	2	2	-	-	-	-	2	1	-	2	-
Connecticut River,	4	-	-	1	3	-	4	4	-	-	-	-	-	-	-	-	-	-
Eastern,*	123	99	6	11	7	5	118	45	73	89	10	33	66	5	1	2	-	1
Fitchburg,	9	1	4	-	4	1	8	9	-	-	1	1	-	2	2	2	-	-
Hartford & New Haven,	1	-	-	-	1	-	1	1	-	-	-	-	-	-	-	-	-	-
Housatonic,†	3	-	-	1	2	-	3	3	-	-	-	-	-	-	-	-	-	-
New Haven & Northampton,	3	-	2	1	-	-	3	2	1	-	-	-	-	2	-	1	-	-
New London Northern,	1	1	-	1	-	-	1	2	1	-	1	-	-	-	-	-	-	-
Norwich & Worcester,	2	-	1	-	1	-	2	-	-	-	-	-	-	1	-	-	1	-
Old Colony & Newport,*	17	4	6	-	7	2	15	10	7	-	4	2	2	3	3	2	1	1
Providence & Worcester,*	9	1	2	2	4	1	8	6	3	-	1	1	-	1	1	1	-	-
Taunton Branch,	1	-	1	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-
Vermont & Massachusetts,*	1	1	-	-	-	-	1	1	-	-	1	-	-	-	-	-	-	-
Worcester & Nashua,	2	-	1	-	1	1	1	2	-	-	-	-	-	-	1	-	-	-
Totals,	280	141	53	26	60	15	265	157	123	115	26	44	97	33	20	16	10	2

* Includ'g roads operated by this Corporation.

† Berkshire, Stockbridge & Pittsfield & West Stockbridge Railr'ds operated by Housatonic R. Co. ‡ One express messenger.

Tabular Statement of Accidents—Concluded.

RAILROADS.	EMPLOYEES—Con.						AT CROSSINGS.				AT STATIONS.		UNLAWFULLY OR CARELESSLY ON TRACK OR CARS.			
	Collision.	Derailment.	Explosion of Locomotive.	Too n'r track, &c.	Various accl- dents.	Fatal.	Not Fatal.	With gates or flag.	Without gates or flag.	Fatal.	Not Fatal.	Fatal.	Walking or lying on tr'k.	Unlawfully rid'g in cars.	Fatal.	Not Fatal.
Boston & Albany, . . .	2	—	3	5	13	20	—	4	1	5	—	1*	16	1	17	—
Boston, Clinton & Fitchburg, . .	—	—	—	—	—	—	—	—	—	—	—	—	1	—	1	—
Boston, Hartford & Erie, . . .	—	—	—	—	—	—	2	—	—	—	—	—	4	—	6	1
Boston & Lowell, . . .	2	—	—	—	1	1	—	—	—	—	—	1	3	1	4	—
Boston & Maine, . . .	—	—	—	—	—	—	—	—	—	2	—	—	3	—	1	—
Boston & Providence, . . .	—	—	—	—	—	—	1	—	—	—	—	—	1	—	1	—
Cheshire, . . .	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Connecticut River, . . .	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—
Eastern, . . .	1	1	—	—	1	1	5	6	1	1	—	2	6	1	6	1
Fitchburg, . . .	—	1	—	1	—	4	—	—	—	3	—	—	4	—	4	—
Hartford & New Haven, . . .	—	—	—	—	—	—	—	—	—	—	—	—	1	—	1	—
Housatonic, . . .	—	—	—	—	1	—	—	—	—	1	—	—	2	—	2	—
New Haven & Northampton, . .	—	—	—	—	—	2	—	—	—	—	—	—	—	—	—	—
New London Northern, . . .	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Norwich & Worcester, . . .	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—
Old Colony & Newport, . . .	—	—	—	2	—	2	4	—	—	—	—	—	1	1	6	1
Providence & Worcester, . . .	—	—	—	—	—	1	1	—	—	—	—	1	4	—	3	—
Taunton Branch, . . .	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Vermont & Massachusetts, . . .	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worcester & Nashua, . . .	—	—	—	1	—	1	—	—	—	—	—	—	—	1	1	—
Totals, . . .	5	2	3	10	5	40	13	12	7	12	7	57	52	8	56	4

* One person while running to assist station-agent remove man from train.

NOTE.—By referring to the Annual Reports, it will be observed that some of the roads have therein reported a larger number of casualties than they reported to this Board at the time of occurrence, viz.: The Boston, Clinton & Fitchburg, five more; Boston, Hartford & Erie, fifteen more; Boston & Lowell, four more; Boston & Maine, one more; Boston & Providence, five more; Cape Cod, one; Cheshire, three more; Fitchburg, two more; Hartford & New Haven, three more; Monadnock, one; New Bedford & Taunton, three; Providence & Worcester, two more; Vermont & Massachusetts, one more; Worcester & Nashua, seven more. The following roads have reported a smaller number in their Annual Reports: Boston & Albany, one less; Eastern, seven less; New Haven & Northampton, one less; Old Colony & Newport, one less. The Eastern Railroad reported to this Board thirty killed and fifty-one injured in the Revere accident, and in the Annual Report, twenty-nine killed and fifty-seven injured. The name of one of the parties reported to this Board as killed, appears among the injured in the annual report.

Tabular Statement of Accidents on Street Railways reported to the Railroad Commissioners for the Year ending September 30, 1871.

RAILWAYS.	Whole Number Injured.	Passengers.	Others.	Children.	Adults.	Fatal.	Not Fatal.	PASSENGERS.				OTHERS.	
								Getting on or off Cars in motion.	Falling from Platform.	Fatal.	Not Fatal.	Fatal.	Not Fatal.
Merrimack Valley,	1	1	-	-	-	1	-	-	1	1	-	-	-
Metropolitan,	6	3	3	-	-	6	-	2	1	3	-	3	-
South Boston,	1	1	-	-	-	1	-	1	-	1	-	-	-
Union,	3	2	1	-	-	2	1	2	-	1	1	1	-
Total,	11	7	4	-	-	10	1	5	2	6	1	4	-

NOTE.—The above table comprises all the accidents reported by the Street Railway Companies to the Railroad Commission; but in their annual returns additional casualties are reported as follows: Lowell Horse Railroad, 1 injured (not a passenger); Lynn & Boston Railroad, 4 passengers and 1 other slightly injured; Metropolitan Railroad, 14 passengers, 1 employé and 5 others injured; Salem Street Railway, 1 passenger injured seriously, 2 slightly; South Boston Railroad, 8 passengers and 4 others injured; Waltham & Newton, 1 passenger injured.

[F.]

RULES AND REGULATIONS FOR OPERATING RAILROADS.

BOSTON AND PROVIDENCE RAILROAD CORPORATION, }
PRESIDENT'S OFFICE, BOSTON, January 3, 1872. }

To the Honorable the Railroad Commissioners of Massachusetts.

GENTLEMEN :—On the 19th of September last a very large representation of the managers of the railroads of Massachusetts met your Board, upon the invitation of the Commissioners, to confer upon the subject of establishing such rules and regulations for operating the railroads of the Commonwealth as would tend to secure the highest degree of safety, and the greatest amount of convenience and comfort to the travelling public. After a free discussion and an unreserved interchange of opinion upon the general subject, it was deemed the most convenient and expedient mode of bringing the conference to some practical and useful results, that a committee should be appointed by the railroad managers present (embracing representatives from nearly all the roads in the State), to consult with the Commissioners from time to time, and agree upon such a code of regulations as would meet the reasonable requirements of the government, and insure the utmost practicable amount of safety in the operating of their respective roads. The undersigned, with his associates named below, were thereupon appointed as such Committee.

Pursuant to these proceedings, the Commissioners and the Committee have had several conferences together, and the Committee, at several meetings by themselves, have diligently and carefully considered every proposition submitted to them by the Commissioners, with the objects before stated in view.

While they are aware that no degree of diligence and forecast in establishing and prescribing rules for the observance of the large number of persons engaged in the railroad business of the State can insure absolute immunity against accident and disaster, they are happy to believe that they have succeeded, with the faithful and laborious coöperation of the Commissioners, in framing a code which will accomplish all that human foresight can suggest, in making the immense amount of travel upon these thronged highways of our people as safe "as the lot of humanity will admit."

I have examined the final revise of this code from the printers, received with your note of yesterday's date, and find it to correspond with the action of the Committee as each several article was ultimately passed upon by them.

I therefore return the proof-sheets, with the earnest recommendation of the

Committee that the code be adopted by all the railroads of the State, as it will be by the managers of the respective roads more particularly represented by the Committee; and congratulating your Board, gentlemen, upon the accomplishment of so useful a work,

I am, very respectfully, your obedient servant,

JOHN H. CLIFFORD, *Chairman,*
Boston and Providence Railroad.

WITH D. W. LINCOLN,
Boston and Albany Railroad.

D. L. HARRIS,
Connecticut River Railroad.

J. B. WINSLOW,
Boston and Lowell Railroad.

WM. MERRITT,
Boston and Maine Railroad.

RULES AND REGULATIONS.

I.—SIGNALS,	1-14
(a.) General Signals,	1-10
(b.) Special Signals,	11-14
II.—TELEGRAPH,	15-18
III.—TRAIN SERVICE, &c.,	19-26
(a.) Precedence of Trains,	19-26
(b.) Speed of Trains,	27-29
(c.) Meeting and Passing,	30-31
(d.) Rules for operating single track,	32-36
IV.—EMPLOYES,	37-105
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(b.) Conductors,	42-69
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(d.) Brakemen,	85-90
(e.) Baggage Masters,	91-92
(f.) Station Agents,	93-99
(g.) Section Masters,	100-103
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(i.) Draw Tenders,	105

A perfect familiarity with the following rules, as well as with all Special Regulations which may accompany the Time Table regulating the current operation of the road, will be expected of all employes of the company, and an ignorance of their requirements will never be received as an excuse for not obeying them.

I. SIGNALS.

a. General Signals,	1-11
b. Special Signals,	11-14

(a.) GENERAL SIGNALS.

1. A single, short whistle from the engine is a signal to “apply” the brakes, and should be promptly obeyed by all whose duty it is to apply them.

Two short whistles, a signal to "let go" brakes.

Three, to "back the train."

Four, to call in flag-men.

2. The whistle must always be sounded or the bell rung eighty rods before reaching a public highway crossing. Regular trains, on time, may sound the whistle briefly at crossings, but irregular trains, and those out of time, should sound a long whistle.

3. The Bell must be kept ringing until the highway is passed; and whenever a person on the track is thought to be in danger the whistle must be sounded.

4. A Red Lantern must be displayed by night at the rear of every passenger train, as a signal to all following trains. A Red Flag by day and a Red Lantern at night, must be displayed on the rear car of every freight train, and in such a position as to be seen from the engine and by any approaching train.

5. A Red Flag by day and a Red Lantern by night, displayed from the engine, is a signal that another engine or train is to follow.

6. A Red Flag by day and a Red Lantern by night, displayed on the track, is a signal of immediate danger, never to be disregarded; and the train must be brought to a stop as soon as possible.

7. Two Flags, one red and one white, stuck by the side of the track is a signal of danger ahead, and the train must proceed with great caution, not exceeding five miles an hour, until the danger is passed.

8. Every Passenger Train should be supplied with not less than two Red Lanterns, and every Freight Train with not less than four. In case of accident or unusual delay at night, one or more red lights should be sent in the direction of any approaching train, to signal it to stop.

9. Torpedoes must be used in addition to flags or lanterns, whenever, in case of accident or delay, there is any liability that the signal-flag or lantern may not be seen, by reason of fog, or otherwise. Engine-men, station agents and section foremen should always be supplied with them. When a torpedo is exploded by the engine passing over it, the train must be stopped immediately.

10. Besides obeying the regular signals named above, engine-men and conductors must give heed to *any* flag by day or *any* lantern by night, when displayed on the track, or *any other signal* implying danger, and bring their train to a full stop to ascertain

the reason for the signal. Anything violently waved before a locomotive must be taken to be a signal of danger.

(b.) SPECIAL SIGNALS.

11. At Draw-bridges.
 12. At Junctions.
 13. At Railroad Crossings.
- } Established for each separate case.
14. In case of dense fogs, so that the special signals cannot be distinctly seen from the usual stopping-place, a man must be sent in advance of the train to receive directions from the signal-man. If the train has the right to pass, he must see that the signal conforms thereto before he returns to report.

II. TELEGRAPH.

Telegraph, 15-18

15. All orders and messages relative to the movement of trains must be written in full (except the telegraph abbreviations of certain prescribed questions and answers, which are perfectly understood by Operators, Conductors and Engine-men). No such dispatch must be delivered until confirmed by repeating and answer.
16. Two copies of the order, when thus found to be correct, must be delivered to the Conductor, who shall give one copy to the Engine-man, who must read and understand the same before starting.
17. Conductors must in no case leave a station when directed by *special order*, without having the same in writing, with the assurance of the person sending it that the Conductor's understanding is correct.
18. In case of accident or detention of a train beyond the card time of such train, notice must be at once given at the nearest station, and the information telegraphed to the central or terminal station, and to those points where approaching trains may be signalled.

III. TRAIN SERVICE, &c.

a. Precedence of Trains,	19-26
b. Speed of Trains,	27-29
c. Meeting and Passing,	30-31
d. Rules for operating single track,	32-33

(a.) PRECEDENCE OF TRAINS.

19. Passenger Trains take precedence of Freight Trains. When a Passenger and a Freight Train have the same time of departure on Table, the Passenger Train will go first.

20. A Regular Passenger Train following another Passenger Train of the same class, or a regular Freight Train following a Freight Train, must be kept not less than ten minutes behind that which preceded it. An Accommodation may follow an Express Passenger Train in five minutes; but if running ahead of an Express Train, the Accommodation must keep fifteen minutes off the time of the Express, unless *special orders* shall otherwise direct.

21. Freight Trains must keep ten minutes out of the way of Passenger Trains which are to pass them.

22. Extra Passenger Trains must keep ten minutes out of the way of regular trains.

23. No train, other than an Express Train, will pass a station where there is no bridge for crossing the track, while a Passenger Train is discharging or receiving passengers; and no Express Train shall pass such station without due warning, and at a speed exceeding ten miles an hour.

24. When two Accommodation Passenger Trains approach a station at the same time, the train running in a particular direction (as the Superintendent may designate), must stop before reaching the station and wait until the other train has passed the station.

25. When a Passenger Train and a Freight Train approach a station at the same time, the Freight Train must always stop before reaching the station and wait till the Passenger Train has passed the station.

26. Unless otherwise ordered, Passenger Trains must be run with express and baggage cars first and the passenger cars behind. When freight cars are run on a Passenger Train they must be placed next to the engine.

(b.) SPEED OF TRAINS.

27. The speed of the several classes of trains will be regulated by distinct and fixed orders from the Superintendent; and such orders must be strictly observed by Conductors and Engine-men, unless by *special orders* they are authorized to run at a different rate.

28. No train will leave a station earlier than the time named in the Time Table: *provided*, that when several *Freight* Trains are running upon the same schedule, the intervals of time between the several trains may be such as each road shall prescribe.

29. All draw-bridges, and all bridges of more than three hundred feet in length, should be approached carefully, and trains should be run over them at a moderate and uniform speed; and over all

shorter bridges in strict accordance with the special rules of the road.

(c.) MEETING AND PASSING.

30. General rules for meeting and passing will be found above, under the head of "Precedence."

31. Where there is a double track, trains should be run only in the direction for which the respective tracks are usually used. Except in extraordinary cases no train should be backed upon its track; and whenever it is necessary so to back a train, or to cross to the opposite track to avoid an obstruction, a red flag by day, or a red light by night, must be sent in the direction in which the train is moving, a sufficient distance in advance to secure safety to any approaching train, and such signal must be kept thus in advance of the train until it resumes its proper track and direction.

(d.) RULES FOR OPERATING SINGLE TRACK.

32. A train must not leave a station expecting to meet at the next station a train having the preference of road, unless it has its full schedule time to reach the meeting point.

33. At meeting points between two trains of same class, the train not having preference of road must take the siding and be clear of main track before the leaving time of the opposite train.

34. In cases where a Freight Train meets a Passenger Train, the Freight Train must clear the Passenger Train ten minutes.

35. When expected trains are not found at the passing places designated on the schedule, trains must be run with great caution to the succeeding station until the expected train is met and passed. Trains should stop or approach with caution the switch used by passing trains to come on to the siding.

36. If any train breaks down, stops, or is delayed from any cause, on the road, the first duty of the Conductor, and of all persons connected with the train, is to see that efficient measures are taken to prevent other trains from running into the delayed train. *One*, and in case of danger, *two efficient men*, must be sent backward or forward, or both, as the case may require, with Red Flags or Lanterns, *at least* half a mile, to stop any approaching train. No wish to have the Signal-men go on in the delayed train must prevent their going forward or backward, at least half a mile, and *staying* there, till the approaching train is stopped; and if a second, third or fourth train is to follow, the same precautions must be observed until the track is clear for any following train.

[NOTE.—SPECIAL RULES for the running of trains (for each road).]

IV. EMPLOYÉS.

a. General Rules,	37-41
b. Conductors,	42-69
c. Enginemen and Firemen,	70-84
d. Brakemen,	85-90
e. Baggage Masters,	91-92
f. Station Agents,	93-99
g. Section Masters,	100-103
h. Flagmen and Gate Tenders,	104
i. Draw Tenders,	105

(a.) GENERAL RULES.

37. Employés of the company must devote themselves exclusively to its service, obey promptly all orders they may receive from those in authority over them, and conform to all the regulations of the company. Negligence in the performance of duty is equivalent to incompetency, and, if not immediately corrected upon admonition, will always be good cause for dismissal from the service.

38. The *safety of the passengers* is the first consideration; to this, together with the *safety, regularity and punctuality of the trains*, and the *comfort and convenience of passengers*, all operations of working or repairing the road must be completely and entirely subordinate.

39. All employés are expected to exercise the greatest care and watchfulness to prevent injury to persons or property; and they must in all cases of doubt take the course which involves no danger. They must be civil and obliging to passengers and others with whom their duties may bring them in contact, must not use profane or improper language, and must avoid altercations with any person.

40. The use of intoxicating drink on the road or about the premises of the company, and smoking while on duty, are strictly forbidden. Any employé appearing on duty in a state of intoxication will be forthwith dismissed, and those who do not use intoxicating drinks will receive the preference in promotions and employment.

41. When on duty, all employés whose duties bring them in contact with passengers, will wear a cap or uniform prescribed for their respective positions; and they will not be allowed to modify either in any respect, to suit individual tastes.

(b.) CONDUCTORS.

42. Each Conductor is required to be familiar with the Time Tables and *all the rules* concerning the running of trains, whether they relate specially to his duties or not.

43. He will have entire charge of the train, and will make its safety his first care. He is responsible for its movements while on the road, and in the absence of a superior officer is to decide all questions relative thereto.

44. He will see that his subordinates are instructed in their duties, will be held responsible for their good conduct and prompt performance of duty, and will report to the Superintendent any misconduct or negligence on their part.

45. He must carry an accurate and reliable watch, regulating the same daily by the *standard time of the road*, and comparing it with that of his Engineman before starting on each trip.

46. He must see that his train is provided with everything required by the regulations of the road, including the tools and implements required by law, and the proper flags and lanterns for signals, as well as spare couplings, links and pins, and all other articles ordinarily required in emergencies; and that a brakeman is kept on the rear car while the train is in motion, and if train brakes are supplied, that the same are properly connected.

47. He must know that all switches which have been changed for his train are left right for the main track, unless they are in charge of a regular switchman, or the conductor of a following train is present and takes charge of it.

48. He will make reports of his train promptly, on the blanks provided for the purpose; and he will report *personally* and promptly, and, also, in writing, to the Superintendent or Assistant Superintendent, all *accidents*, and all unusual occurrences.

49. When he has reason to believe that his train has passed over a broken rail, he must stop the train, and if he ascertains that such is the case, if the Section Master is not at hand, he will leave a brakeman with a red flag or lantern and torpedoes, sending him back a sufficient distance to prevent accident to any train following. He must also notify the agent at the next station and telegraph the fact to the central or terminal station.

50. He must see that the several rules in relation to signals are strictly observed.

51. PASSENGER CONDUCTORS will be subject to the foregoing general rules, concerning all Conductors, and also to the following:—

52. Each Passenger Conductor, when on duty, will wear the cap or uniform prescribed by the management. He must be at the station at least fifteen minutes before the time for starting his train; see that the Baggage Master and Brakemen are in attendance, and that the cars are clean, properly warmed and well

ventilated, and at night, well lighted; and he must be sure that the bell-cord is properly adjusted through all the cars of the train. If any car is not found in good condition and properly equipped, or there should be insufficient accommodation for passengers, he will notify the Depot Master, or other officer having charge of the cars, before starting.

53. He must look after the safety and reasonable comfort of passengers, and instruct his Brakemen how to do the same; and he must endeavor to have passengers observe the following "Cautions to Passengers":—

Not to get upon nor leave cars *while in motion*, but wait until the train has come to a *full stop*;

Not to put heads or arms out of car windows;

Not to stand upon the car platforms;

To get upon the train from the station platform, and not from the opposite tracks;

To enter the cars by the *rear* door and leave them by the *forward* door.

54. He will cause the name of each station at which his train stops to be distinctly announced in each car. If the train stops short or runs by a station, so that it must be moved again before a final stop, the call should not be given till the final stop. He must allow passengers sufficient time to enter and leave the cars in safety, assisting them when necessary, but avoiding any unnecessary delays, and adhering as closely as possible to the Time Table.

55. In his intercourse with passengers he must be polite and obliging. He must see that order and decorum are preserved in the cars, and prevent the annoyance of passengers by the rude or improper conduct of others. [If disorderly conduct is persisted in by any passenger after remonstrance from the Conductor, such passenger should be removed to the baggage car and detained there or ejected from the train at a station.]

56. When, for the non-payment of fare or disorderly conduct, it may become necessary to remove a passenger from a car, the Conductor must be careful to use no more force than is absolutely necessary to accomplish the purpose. In every such case of ejection he will ascertain the names and address of some of the passengers, who from a knowledge of the facts can be called upon to testify to them, if necessary, and send them with a full written statement to the Superintendent.

57. He will not permit any person, not authorized by the Superintendent, to sell books, papers or other articles upon the cars, nor

allow passengers to be annoyed by travelling musicians or persons asking charity.

58. He will require of each passenger on his train a ticket or a pass signed by a proper officer of the company. He will require of any passenger failing to produce such ticket or pass the usual fare for the distance such passenger is going, in money. Such employes on duty, as the Superintendent may designate, will also be passed free over such part of the road as their duty requires them to go over.

59. If any person refuses to show a ticket or pay his fare, the Conductor will cause him to be arrested and dealt with according to law.

60. All money paid to the Conductor must be noted on his way-bill, giving number of passengers and naming points at which each entered or left the train. All passes must be returned to the Superintendent or other proper officer.

61. Upon the arrival of a Passenger Train at its destination, the Conductor must remain with his train until all the passengers have left it. He must see that the windows are closed, lights extinguished, and that there is no danger from fire in the stoves, except where some other person is designated to perform those duties.

62. The Conductor will promptly report to the Superintendent, or other proper officer, any damage which may occur to cars of his train, or any other cars or property belonging to the company, of which he may have knowledge.

NOTE.—[Special rules in relation to punching tickets, season ticket-holders, stop-over checks, &c.]

63. FREIGHT CONDUCTORS will be subject to the general rules concerning all Conductors (59 to 69), and also to the following:—

64. Each Freight Conductor will see to making up his train, and that the doors of all the cars are closed and properly secured. If any car is not so loaded that it can run with safety to the freight or train, he will notify the agent at the station and leave it to be reloaded.

65. Each Conductor will be held responsible for the faithful performance of duty by the Brakemen on his train, and will, in all cases, see that they are at their posts. The Conductor will always station himself where he can see and signal his men, and must always have a Brakeman on the rear car.

66. He will observe whether the bridge-guards are in good order, and if not, he must promptly notify the Superintendent.

67. He will see that his train is provided with the necessary signals, and that they are used according to the rules concerning signals, in case of accident or otherwise.

68. He must follow the Time Table as nearly as possible in running his train, and will be further governed by the *special rules* relative to his duties.

69. He will not allow any person to ride in the cars on his train without an order from the Superintendent or other proper official.

(c.) ENGINEMEN AND FIREMEN.

70. Each Engineman is subject to the direction of the Conductor while his engine is attached to a train.

71. He must carry a reliable watch, regulating the same daily by the standard time of the road, and always comparing it with that of the Conductor before starting on each trip.

72. He must see that his engine is kept clean and in good order, that it is supplied with all necessary tools, and that everything is in perfect order and in its proper place. He must promptly report any defect to the Master Machinist for repairs.

73. He must never fail to have a head-light upon his engine when running at night.

74. He must run according to the *Time Table*, and the *special rules* of the road governing speed, and the general rules regulating the precedence and running of trains.

75. He must keep a vigilant look ahead, be watchful for all signals, and promptly govern his train in accordance therewith, stopping it if necessary to learn the meaning of any signal, and *always stopping* when there is a *danger signal*.

76. He must notice all whistling posts, and give the required warning for at least eighty rods, before crossing any highway or travelled road at grade.

77. He must bring his train to a full stop before reaching any railroad crossing, as required by law, and wait till he knows that the signal is right for him to proceed.

78. He must approach switches carefully, and if they are not right must stop. In thick and foggy weather he must take extraordinary precautions, both at switches and at all places where his right to proceed depends upon signals, *strictly observing the rules* in relation to special signals at crossings, junctions, draw-bridges, &c.

79. When one train is following another, the Engineman will

approach stations with caution when there is reason to expect other trains to be standing there.

80. He will not allow any person to ride upon his engine without an order from the Superintendent, or other competent authority, except officers of the road whose duties may call them there.

81. He must be familiar with *all* the rules in relation to the running of trains, and must at all times take every reasonable precaution to guard against accident, and *in cases of doubt must always adopt the SAFE course.*

82. In case of accident, he will make a written statement of facts to the Superintendent or Master Machinist.

83. Firemen are under the direction of the Enginemen when running and must obey their orders, and must perform such duties about the engine as may be required of them.

84. Both Engineman and Fireman must be on the engine when it is in motion, except when the Fireman is necessarily sent to a switch, crossing or signal station, or to warn other trains; and when the engine is standing, one of them must remain with it.

(d.) BRAKEMEN.

85. Brakemen will be under the direction of the Conductor while on the train. It is their duty to keep the cars neat and clean, to connect the bell-cord through all the cars with the engine, to take care of the lamps and stoves, and do such other work on the train as the Conductor requires. They must be at their brakes while the train is moving, except when called away by direct order of the Conductor.

86. One experienced Brakeman must ride upon the rear car of every train, and it will be his duty to keep the signals for the rear of the train in good order and to attach them in the proper positions when running; and in case of accident, delay or any appearance of danger, he will immediately provide for the safety of the rear of the train.

87. Brakemen when on duty must wear the prescribed cap or uniform.

88. They are expected to acquire a sufficient knowledge of their duties and familiarity with the road to be able to stop their trains at regular stopping places without the whistle being sounded for that purpose.

89. They will notify passengers upon the platforms of the cars that it is contrary to rule to stand there; they will be civil to all passengers, and give all proper information respecting their trains to those getting upon or leaving them while they are on duty;

they will not smoke, read, or converse except to give necessary information, nor pass through the passenger cars except in discharge of their duty.

90. When trains break apart great caution must be used in applying the brakes so as to avoid a collision between the disconnected parts.

(e.) BAGGAGE MASTERS.

91. *Train Baggage Masters* are under the direction of Conductors. They will wear the prescribed cap or uniform when on duty, and will not leave their cars on the arrival at the destination of the train until all baggage has been delivered.

They are required to handle baggage carefully, and are to remember that the law imposes a fine of \$50 for injuring or destroying baggage.

92. *Station Baggage Masters* will be at their posts during such hours as may be required, ready to attend to the wants of passengers. They will be polite and obliging to all, and give all proper information in relation to the transportation of baggage over connecting lines, &c., see that their rooms are in a neat and orderly condition, keep an accurate account of checks on baggage received or delivered, and report immediately to the proper officer any claim for lost or damaged baggage.

NOTE.—[Special Rules in relation to baggage.]

(f.) STATION AGENTS.

93. Station Agents have charge of the company's property at their respective stations, and the general direction of the business of the road at those points, subject to the general rules and special orders.

94. They will see that all parts of the station buildings and yards are kept neat and clean, and must not permit disorderly or idle persons to loiter around the premises, to the danger of property or the annoyance of passengers.

95. They are required to have their ticket-offices open at least fifteen minutes before the arrival of each train that stops at their station, and to keep them open till three minutes before the train's arrival. They must be prepared to give any information respecting trains upon the road, and concerning all connecting trains on other roads; must treat passengers with politeness and see that their subordinates do likewise. They will check the baggage of passengers and see that it is properly marked and put upon the proper train.

96. They will have charge of the tracks, sidings, switches, &c., at the station, and will be held *responsible for the security and position of the switches*. They will also see that cars on side tracks are properly blocked and do not obstruct the use of other tracks, or in any way endanger the safety of passing trains. When trains are due they must know that the track is all right for them to pass.

97. They will be held responsible that their stations are properly supplied with flags and lanterns of the different colors, and other signals.

98. They are required to notice all signals on trains and to govern themselves accordingly. They must show signals required by special rules, and in case of any danger to approaching trains must send signals to warn them. They must communicate promptly and without fail any dispatch concerning the running of trains to the Conductors of such trains.

99. They are required to note the time at which any train passes their station, and to signal it to stop if following another within the time prohibited by the rules of the road. They are directed to report all cases of trains running contrary to the prescribed rules of the road.

(g.) SECTION MASTERS.

100. Section Masters will daily examine the track on their respective sections and see that it is in good condition and safe for the passage of trains. They will also frequently examine the sides of all cuts and remove therefrom rocks, trees, stumps or earth, which may be in danger of falling upon the track; guard all points where exposed to wash or injury of any kind, taking especial care in stormy weather; keep rails clear at crossings during snow-storms; keep fences in repair and report the names of owners of cattle that may be found on the road; and they will see that no wood, lumber, sleepers or other obstructions are piled within *six feet* of the track.

101. They will *in no case* remove a rail or obstruct the track without stationing a man with a red flag one-quarter of a mile back, or in both directions if there is a single track, to warn approaching trains.

102. They must know the time when all regular trains are due and keep the track clear for them, and must be on the look-out for flags or lanterns which announce extra trains, guarding the track till all such extra trains or engines have passed.

103. They will keep the Road Master fully informed of all that it may be necessary for him to know in regard to the wants of the

track, and report promptly all slides, obstructions, defects of track and fires near the road.

(h.) FLAGMEN AND GATE TENDERS.

104. Flagmen and Gate Tenders must be provided with flag and lantern; they must know the time when each regular train should pass the highway where they are stationed, and notice all signals for extra trains, keeping a vigilant lookout for the same. When a train is approaching they must seasonably close the gate or show the signal and endeavor to prevent any one crossing the track, and must keep the gate closed or display their signal until the train has wholly passed. They will keep the track across the road clean, and in case of obstruction will warn trains by showing the danger signal.

(i.) DRAW TENDERS.

105. Draw Tenders must be at their posts at all times required by the special rules relating to their draws. They must keep the draw closed and in order for the passage of trains at all times when not required to be open for the passage of vessels. They must see that their signals are always in order, and must use the utmost vigilance in causing them to be shown whenever the draw is open and until it is completely closed and ready for the passage of trains.

They must be familiar with the laws of the Commonwealth in relation to draw-bridges on railroads, and must strictly observe the special rules of the road relating to the draw under their charge.

[G.]

BURLINGTON & MISSOURI RIVER RAILROAD.

OFFICE OF GENERAL SUPERINTENDENT, BURLINGTON, IOWA, Dec. 16, 1871.

C. F. ADAMS, JR., Esq., *Boston.*

MY DEAR SIR:—Your note December 6th duly received. Excuse my delay in answering. The objection made by the railroad managers to the “Miller coupler” will be found, I think, invalid on thorough trial.

Passenger trains do not, as a rule, *stop* on hills, and any ordinary trains can be started on the level with the Miller attachment. Once in motion, the train is no harder to pull *with* than without the Miller, and with it the passengers are safer and more comfortable.

We held out for some time on the theory that with our seventy feet grades we needed the old-fashioned “slack,” and could not do without it; but our experience has since shown that we were mistaken, and we experience no difficulty. Any way, it is only a question of power, and if the engines now in use cannot start such a train as the public demands, perhaps other engines could be got that would do so.

As a help to trains starting away from stations, and in saving wear and tear in stopping at stations, I think the track should be elevated a little for a train length at each station. Very likely your railroad men have found this out. I don’t do it, or haven’t done it; but it should be done.

On the short trains which ply about Boston, and stop every quarter of a mile or so, the Miller coupler might be objectionable if the trains were very heavy, because it would take a little longer to start them than it does now. To remedy this, engines of weight enough could be put on, which would involve more expense,—possibly more than would be worth while. I should hardly think, however, that the short trains which make frequent stops were heavy enough to trouble the engines now in use. As to the Miller coming undone on curves, there is a danger if the road is rough and uneven, and as a safeguard we put chains on the cars.

We have had no accidents in the two years we have been using the coupler, and our Burlington & Missouri is not as smooth as your New England roads.

Yours truly, C. E. PERKINS.

PHILADELPHIA, WILMINGTON, & BALTIMORE RAILROAD COMPANY.

PRESIDENT'S OFFICE, PHILADELPHIA, December 30, 1871.

CHARLES F. ADAMS, JR., Esq., *Railroad Commissioner's Office, No. 7 Pemberton Square, Boston, Massachusetts.*

DEAR SIR:—Your letter of the 6th inst. was duly received, and I have availed myself of your permission to defer my reply until this date. I take, in the order in which you place them, the several subjects upon which you ask my opinion.

1st. "*Car Construction.*"—I send you drawings showing mode of construction adopted by this company. You will see that the floor-timbers are framed so as to oppose their greatest strength to resist the shocks of concussion with other cars. The mode of framing where two outside longitudinal sills were framed together by small cross girders was discarded generally long since. The side and end frames of the car are so braced and tied as to become practically complete trusses. We have for three years past used exclusively the Miller platform. It possesses amongst other advantages, that of enabling the passenger to pass safely from one car to another, that of checking the passage of dust upwards into the car, that of allowing the act of coupling to be performed without risk, that of preventing the annoyance of passengers by the jerking motion experienced on starting trains fitted with the common draw-bar and coupling, and, above all other advantages, as compared with the platform in common use, that of preventing that which is styled "telescoping." An accompanying letter from the superintendent of machinery of this company, Mr. G. W. Perry, a man of excellent judgment, great experience and close observation, will convince you, I think, that objections to this mode of coupling, on the ground of insecurity on curves, or difficulty in starting trains, are of little weight. We find, however, that greater care in drilling cars loaded with passengers is required with the Miller platform than with the ordinary platform, in order to prevent jar.

2d. "*Car Lighting.*"—The best and safest method of lighting cars is, I think, that of using large metallic lamps, securely attached to the roof of the car over the aisle. They should be three in number, to a car of sixty-four seats, and we use kerosene oil not inflammable below 140° Fahr. For reading lamps in parlor or compartment cars, the paraffine candles are good and safe.

3d. "*Car Heating.*"—No mode yet used by this company compares with the warm-water system, where warm water in gas pipes

circulates quite around the car at its side, next to the floor, with coils under each seat. It diffuses a moderate and sufficient heat through the car. It makes the lower strata of air warmer than the upper. It affords a good "foot-warmer" without over-heating the head. It is the safest, comparatively, of all modes of heating, in event of overturning a car. It is, to be sure, a costly apparatus, but a great economizer of fuel.

4th. "*Car Brakes*."—I consider it essential that the engineman as well as the brakemen shall have power over the brakes. We have, during the past three years, tried three methods, each of which complied with this condition. Of all of these we think the Westinghouse the best, and we are applying it to all of our passenger engines and cars as rapidly as we can procure apparatus from the shops. I have tried no electric brake, and only the Loughridge, the McCambridge, and the Westinghouse. I hope that experience in the use of the latter will lead to improvements in its details. I refer you to Mr. Perry's remarks upon brakes.

5th. "*Spark Arresters*."—The place in which to arrest sparks is, in my opinion, the boiler rather than the smoke-stack. As a rule, so far as my observation extends, all spark arresters attached to the smoke-stacks call for a larger or smaller expenditure of steam, in proportion as they offer greater or lesser obstacles to the draught. They are necessary evils, in the present state of the art,—necessary, inasmuch as in their absence the fire risk is too great; evils, inasmuch as you cannot separate sparks from the smoke and gases without an expensive expenditure of smoke and steam to maintain a sufficient draught in the fire-box. It is to be hoped that some of the many ingenious plans for effecting complete combustion in the boiler, now being tried, may result in the prevention of sparks and smoke, an enlarged area of exhaust-pipe, and the saving of fuel, as well as the lessening of fire risk and annoyance. This company will, early in February, have in use on trial a locomotive built with the Weston boiler, and we hope to find that this boiler will consume the fuel more thoroughly than any now in use, and show a proportional diminution of sparks.

6th. "*Permanent Way*."—We have tried many forms of safety-switches, and prefer the Wharton, which leaves the rails of the main-track at the switch immovable and uncut, and consequently offers no open joint to cause a jar of the rolling-stock and a battering of the rails. With this switch properly laid down, it seems impossible to get a train off of the tracks. The worst that could happen would be turning a train in on to a side track. With Wharton switches, and with self-adjusting steel frogs of the Wood

or of the Cleveland variety, we think that we have made a considerable saving of expense, while affording greater safety and comfort to passengers.

7th. "*The relative danger from breakage of steel and iron rails.*"—In 1869 we had about twenty per cent. of steel in track. We broke six iron and two steel rails. In 1870 we had about thirty-one per cent. of steel and steel head in track, and broke seven iron and three steel rails. In 1871 we had about fifty-one per cent. of steel and steel head in track, and broke fifteen iron and seven steel rails, and one steel head. Of forty-one rails broken during the three years cited, all but three were broken at one end. For some years past this company has had every rail numbered and marked, the date and place of laying and the kind of joint used recorded, and, in fact, a history of each individual rail, with the name of the maker, so kept as to enable us to testify positively as to the service performed by each rail of each manufacturer whose rails we use. The winter of 1871 was destructive to rails, in consequence of the track being upheaved and otherwise displaced by freezing and thawing of road-bed. I would observe here that the system of numbering and recording used with our rails is applied also to switches, frogs, wheels and axles. To compare our breakage with that of other railroad companies, you will note that we ran for the three years cited an average of about one million of train miles per annum, more than one-half of which was with heavy engines on fast passenger trains. I will add that we had no accident resulting from a broken rail during the three years named.

8th. "*The most effective way of guarding against accidents in case of running off the track on or near bridges.*"—I think that the most effective and practicable method is to have firmly fastened parallel to, and about two feet distant from, the outer rail of each track, an oak stick, say nine inches square, the base of which lies in same horizontal plane as the base of the rail. This stick is continuous on each side of the track for the whole length of the bridge and its approaches.

9th. *Signals.*—"The degree of reliance which should be placed on the telegraph in controlling the movements of trains."

We place the most entire reliance upon our telegraph system, and control the movements of all trains by its means. With this I send you a report made to me by Mr. H. F. Kenney, the superintendent of this road, with some papers explanatory thereof. I think that you will become acquainted with our system by reading this report better than by the perusal of anything which I can write.

During the year 1865 the earnings of this company were more than \$37,000 per mile of road. Our double track extended only six-tenths of the length of the road. And I thought, and think, that it would have been impracticable to have done this amount of business without the aid of the telegraph, as much of it was irregular, particularly the movement of troops and stores.

10th. *"The block system as regulating the movements of trains."*—I think that wherever trains are required to run at short intervals in the same direction the system of working by "blocks" should be resorted to for the purpose of securing intervals of space instead of merely intervals of time between trains. And I think it especially necessary to run by safety signals rather than by danger signals; that is, at critical points the engineman stops unless a safety signal be shown, instead of running until he sees a danger signal. I am now considering the several systems for securing distance between trains, with a view to adopting the best upon the most crowded portions of our road. It seems to me that much remains to be altered or added to with either of the block systems now in use in this country.

I much regret that I have been forced to write the above with a hasty pen. * * * * *

Very truly yours,

ISAAC HINCKLEY.

THE PHILADELPHIA, WILMINGTON & BALTIMORE RAILROAD.

SUPERINTENDENT'S OFFICE, PHILADELPHIA, November 28, 1871.

ISAAC HINCKLEY, Esq., *President, etc.*

DEAR SIR:—Please find herein a review of one day's work in moving trains, both on the main and Delaware railroad lines.

* * * * *

Please observe that the frequency with which sidings occur, is in accordance with our conviction that too many opportunities for trains to meet and pass cannot be provided. We have not thought it best hitherto to establish any prescribed rules for the government of a dispatcher, upon which he might depend exclusively, as in the case of some other employés, but having impressed him with a perfect understanding of his duty, viz., to move trains over the road in the most expeditious manner, consistent with safety, we have laid upon him certain restrictions, embodying things *not* to be

done, and issued no rules except such special instructions as may be demanded from time to time by emergencies.

The dispatching office of both roads is at Wilmington, twenty-eight miles from Philadelphia, and about seventy from Baltimore. The practice in giving a train telegraphic orders, is as follows: The conductor of the train desiring such order, notifies the dispatcher, from the nearest telegraph office, that he is ready to leave. Running orders are given him in full, ending with the question: "How do you understand?" A reply is immediately sent, commencing: "I understand," and then giving the substance of the order in full. This reply is taken by the operator to the dispatcher's office, and written upon the back of the original message, and marked with the time, and initials of sending and receiving operators. If in accordance with the first message, the dispatcher gives "All right," the train proceeds, but not otherwise. The conductor must write or at least sign, his reply in person. The order, as delivered to him, is endorsed "O. K.," and marked with the initial of receiving operator. When an order is issued to a train at Wilmington, the order is written in duplicate, one copy given to the conductor and the other retained in the office. The latter is marked with the time of delivery, and signed by the conductor, as evidence that it is understood. When a train is running according to its schedule time, it is not under orders from the dispatcher, such orders being issued only to extra, or irregular trains, and to regular trains, when behind time. The dispatcher, furthermore, is the only person authorized to move a train, under any circumstances whatever.

Among other things to be observed by the dispatcher are, not to take any rights or privileges from one train and transfer them to another, without first ascertaining, in the usual form of train order, that it is surely understood by the former train (for instance, if a preferred train is delayed, and it is desired to bring an unpreferred train towards it to a point beyond the usual meeting place, this order must first be understood by the preferred train); to be sure that trains following each other are at least ten minutes apart; to so provide, in all cases possible, that trains may meet or pass, or receive additional orders when any may be needed, at a telegraph station; and to bear in mind that it is far better to delay an express passenger train than to increase in even the slightest degree the liability of *any* train to accident.

The messages of November 8th are taken at random from our files.

In the office at Wilmington the operators keep a record of the arrival of all trains, regular and extra (except the short trains between Philadelphia and Wilmington), at the principal telegraph stations. Copies of these records are given in package G. By them the dispatcher ascertains at a glance the whereabouts of all trains, and issues his orders accordingly.

At 12.48 A. M., an extra freight was started from Philadelphia (Dispatch No. 1) for Baltimore. This was about one hour behind No. 17 freight, of the preceding day, and directly behind No. 1 express passenger. There were also on the road an empty engine returning from Wilmington, and No. 35, of the preceding day, express passenger, north. The instructions given in the message and the time-card were all that the conductor needed for his safe conduct into Baltimore.

No. 2. A gravel train was sent north,—Wilmington to Thurlow, and return,—then to work between Wilmington and a point near by. This train was thus limited in its movements for the day. It could not use the main track when a regular train was due (General Rule, No. 98), and must keep a signal-man posted at a safe distance, on the watch for any extras.

No. 3. A train of coal was sent from Perryville to North East, and return, with instructions to avoid regular trains, and watch for track men. Nearly all this time the train was within reach by telegraph, in case of an emergency. At 10 A. M., it was found it would be necessary to give orders to trains Nos. 26 and 27, and for that reason dispatch No. 4 was sent to the agent at Baltimore.

At noon it was discovered the New York portion of our No. 9 express would be delivered to us late, at Gray's Ferry, and it would be necessary to run that portion in a separate or extra train. This train, having the right of road, like No. 9, was given orders (No. 6) to go to Wilmington, looking out for track men.

At the same time it was an imperative duty to warn trains that were on the watch for No. 9, to keep clear of the second section of that train also. The gravel train near Wilmington could not be reached directly by telegraph.

Dispatch No. 5 will show that the conductor of accommodation train No. 8 was made responsible for a correct understanding of the fact by the conductor of gravel train. Train No. 2 was warned at Perrymansville (No. 7), and No. 20, which was likely to cross the track at stations, was warned at North East (No. 8). On the arrival of second section of No. 9 at Wilmington, it was there given written orders (No. 9) to go to Perryville. Engine No. 39, which brought this extra passenger train to Wilmington, had to be re-

turned to Philadelphia (No. 10), being cautioned in its written orders concerning regular trains, and such extras as were then out.

At 2.15, train No. 26 asked for orders from Baltimore (No. 11), as per message (No. 4). This train was ordered to Chase's for further orders. At this point the single track begins, and extends north nearly to Aberdeen. (See B.) It was the design when No. 26 reached Chase's, if the second section of No. 9 had not been passed, to bring the former to some meeting place on the single track, or to hold it at Chase's, until this extra train passed south, as might be required to insure safety. As, however, the trains met on the double track, between Canton and Chase's, No. 26 received orders at the latter place to run by its time-card (No. 14). No. 27 was ordered in No. 12 to meet the extra train on this same double track, and then run by its regular schedule; and in No. 13 all these plans and provisions were distinctly understood by the conductor of the extra train, and running orders given him into Baltimore.

Next, No. 11 had to be run in two sections, both being united in one train at Wilmington.

At 4.30, train No. 20 was sent north from Wilmington, and received written orders (No. 15) to keep on its own track until both sections had passed. The same order was given to the gravel train north of Wilmington (No. 16), and in the same manner as in the case of detention to train No. 9. The engineman of No. 11 was made responsible in having it understood. This is considered safe, but it is to be remembered the gravel train is also constantly watching for extras. In No. 17 the second section is ordered to Wilmington, and cautioned about keeping a safe distance behind No. 11 proper. It is furthermore ordered to look out for the gravel train.

In No. 19, the engine which took the second section of No. 9 to Baltimore, was given orders to return to Wilmington, with empty cars, and cautioned about No. 26, which it was likely to overtake, and in No. 18, train No. 26 was notified to look out for the extra.

Our telegraph lines are leased from the Western Union Telegraph Company, and by our contract, we are guaranteed the exclusive use of two wires, so that if our usual wires give out, they immediately provide us with substitutes. The operators are all controlled by our company.

* * * * *

Respectfully submitted,

F. S. KENNEY, *Superintendent.*

PHILADELPHIA, WILMINGTON & BALTIMORE RAIL-
ROAD COMPANY.OFFICE OF THE MASTER OF MACHINERY,
WILMINGTON, DEL., December 26, 1871. }ISAAC HINCKLEY, Esq., *President P., W. & B. R. R. Co., Philadelphia.*

DEAR SIR:—In answer to yours of December 13th, 1871, allow me to call your attention to the tracing sent you with this letter. The tracings show the way this company build their passenger cars. I consider the system of their construction equal to any in use.

As to the Miller buffer, I consider it the best yet offered to railroads, as it entirely prevents telescoping, and starts as easily as any train not having three or four feet of play in a train of twelve cars. It will allow a train to be started much easier than a train of the same number of cars coupled with screws to take up the slack. This system of screws is used in England, but the Miller buffer accomplishes the work much easier and better.

As to its uncoupling on short curves, I will say it does not uncouple on some of the shortest curves near Pittsburgh, Penn., nor will it uncouple on any curve, if it is rightly applied to the cars. It has worked successfully on this road, and I can say I do not know of any cause of complaint.

Your question as to my views of a spark-arrestor, I will have to answer I do not know of any spark-arrestor that will perform its duties, and furnish steam in the required quantity. I think that the sparks should be consumed in the fire-box.

Concerning a brake for cars, I consider the Westinghouse air-brake the best in use. It has worked well on the cars of this company, and given entire satisfaction. I know of no reason why it should fail to give satisfaction when applied to a train of cars. It gives the engineer control of his train, and allows him time to stop the train in time to prevent disasters.

I will with pleasure answer any other questions you may desire to ask.

Yours truly,

(Signed)

GEORGE W. PERRY,
Master of Machinery.

CHICAGO, BURLINGTON & QUINCY RAILROAD.

GENERAL SUPERINTENDENT'S OFFICE, }
CHICAGO, September 5, 1871. }

Mr. C. F. ADAMS, Jr.

DEAR SIR:—I have yours of September 1st, asking the result of our experience of the Miller platform in case of collisions, and the Westinghouse air-brake.

Miller's method of arranging platforms has been in use on the passenger cars of this road for more than four years, in which time there have been three collisions by trains meeting each other, and one by an engine without a train, running into the rear of a train standing at a station. This last was where an engine was immediately following a train at night, and through the want of sufficient caution on the part of the engineer, and a slight interruption in the regular working of the means of stopping the engine, a slight collision occurred, but not with force enough to illustrate the effectiveness of the Miller platform in collisions of this kind.

Upon the other occasions mentioned, when the trains met each other with a combined velocity of from thirty-five to fifty miles per hour, the trains being composed of from three to five cars each, the cars did not "telescope" at all, nor did any of the platforms break down (by which means so many faithful brakemen have been crushed), nor were any passengers injured, further than by being jarred in being thrown forward against the backs of the seats.

The reasons for not "telescoping" are very clearly shown in Mr. Miller's circular, whilst it is very obvious that a large part of the force of concussion is expended on the strong buffer springs. In one case the passenger coaches being unhooked from the baggage car by the blow, instead of piling up, recoiled by the action of the springs, about fifty feet, and stood on the track quite uninjured.

It is obvious that in the case of the collision at Revere, if the passenger cars had been equipped with the Miller platform, the shock would have been mitigated in a measure, from the rear car of the Beverly train being prevented by the intervening springs from striking against the next car ahead with so strong a blow. In my judgment it is the best method of coupling passenger cars at present in use.

We have had the Westinghouse air-brake in use about a year—first experimentally, and afterward on all the passenger and baggage cars.

It admits of an instantaneous application of all the brakes on the train by the engineer, up to the point of sliding all the wheels of

the train in a second of time; and this being said, there is no room for saying more as to its effectiveness.

The machinery is simple, and as little liable to get out of repair as any machinery can be; yet the brakemen are retained, as against possible failure in any of the parts, as well as to render such assistance on the train as the proper care of passengers may make desirable.

* * * * *

Yours truly,

ROBERT HARRIS.

[H.]

REPORT ON THE SIGNAL SYSTEM OF THE NEW JERSEY RAILROAD.

NEW YORK, Jan. 22, 1872.

To the Honorable Board of Railroad Commissioners.

I herewith respectfully present the following report on the signal and telegraphic system of the United Railroads of New Jersey:—

The running of all trains on the main line of railroad between New York and Philadelphia is controlled by a series of safety signals operated in connection with a telegraph line employed exclusively for this purpose.

The system is arranged, in general terms, as follows: Telegraphic signal stations are established along the line at distances apart corresponding to the shortest interval that is permitted by the regulations of the road between any two trains going in the same direction. The engineer of each train, upon passing one of these stations, is informed by means of the proper signal if the preceding train going in the same direction has passed the next signal station in advance. In the absence of a signal denoting that such is the case, the train is required to stop and receive explanations, and is either detained until the preceding one has been heard from, or else is allowed, by orders from the proper authority, to proceed on its way, using all necessary precaution, and expecting to overtake a disabled train.

On the New York and Philadelphia Railroad there are thirteen signal stations between the northern terminus of the road, at Jersey City, and New Brunswick, a distance of thirty-one miles. This portion of the road is therefore divided into fourteen sections, averaging but a little over two miles each. As a matter of fact, none of them are more than three miles.

The number of regular trains which leave Jersey City during each twenty-four hours is forty, and the number arriving is the same. Of these, twenty run to and from New Brunswick and points beyond, and the remainder are local trains for the accommodation of the citizens of Newark, Elizabeth, and other intermediate points. With a single exception, none of these trains leave Jersey

City at a less interval than ten minutes apart, this exception being a slow way train leaving four minutes behind an express train.

Between New Brunswick and West Philadelphia, a distance of 58.25 miles, there are twelve signal stations, averaging about four and a half miles apart. There are on this portion of the road seventeen regular trains each way daily between New Brunswick and Trenton (twenty-six miles), and twenty-four between Trenton and Philadelphia.

In passing over certain portions of the road in the cities of New Brunswick, Elizabeth, Newark, and Jersey City, the movements of the trains are not under the control of the safety signals. All engines or trains going in either direction are obliged by the regulations to run with caution at these places, so as under no circumstances to endanger a preceding train. These portions of the track are much occupied with branch trains, shifting engines, crossings of other roads, etc., etc., which makes it necessary to except them from the general system.

The signal employed is a white board, or a white light at night, shown through an orifice two feet in diameter, in a black signal-box, and placed in a conspicuous position at the side of, or directly over, the track, so that it can be seen as far as possible. A partition within the box separates the signals for the opposite directions. A screen of red cloth covers the orifice in the box when the signal is in its normal position, concealing the white board by day, or coloring the light red by night. The safety signal is exhibited to an approaching train by the telegraphic operator, who pulls a cord attached to it and terminating in his office, which lifts the red screen and exhibits the white board or light. The moment the engine passes he lets go the cord, and the red screen again drops into its normal position by the action of gravity, concealing the white safety signal.

When within half a mile of a signal station, each approaching train gives a long, loud whistle. On hearing this, the operator at the station at once exhibits the white signal, providing that all preceding trains have passed the next station in advance, and he knows of no other obstruction.

If the white signal is not shown, the train is stopped in order to obtain information from the operator in regard to preceding trains which have not passed the next station, or of any other obstruction.

In case the train is allowed by the train-dispatcher, or other authorized person, to proceed without the safety signal, and without knowing where the preceding train is, the engineer is required to

look out carefully for obstructions, and keep his train perfectly under control till he reaches the next signal station.

When a train has passed a signal-station, the time of passing is at once reported back to the last station and forward to the next one in advance, as well as to the principal office at Trenton or Jersey City, as the case may be. No operator is permitted to report a train as passed unless he has seen the red flag or light at the rear of the train, in order to be sure that no cars have been uncoupled and left on the track in the way of a following train. When this does happen, he reports the fact to headquarters, and the proper telegraphic instructions are issued to provide for the case.

Trains passing a signal station, and which have not come from nor passed the preceding station,—for instance, when coming in from a branch road,—are required to notify the operator of that fact, so that he will not report it back, and cause a risk of its being mistaken for another train which may have passed the preceding station. When a train is to stop or leave the main line between two signal stations, it is required to report that fact to the last station it passes. In this case the operator does not show the white signal, but explains the circumstance to the next succeeding train.

Each operator is provided with a blank time-card ruled in two divisions, one for north bound and the other for south bound trains. Each division has five columns in which he is required to set down respectively:—

1. The designating or schedule number of each train passing.
2. The designating number of the locomotive.
3. The time the train passed the preceding station. (This is done when the report is received from that station before the arrival of the train.)
4. The time of passing this station.
5. The time of passing the next station in advance (as per subsequent telegraphic report.)

By consulting this card the engineer or conductor of a train can inform himself of the proximity or movements of other trains.

A large blank time-card, called the train-sheet, is kept at the head office, and filled up from the telegraphic reports of the stations along the line by an operator constantly on duty. It thus serves as a complete record of the movements and actual position of every train on the road at all times. This sheet is also in two divisions for north and south bound trains respectively, and one horizontal ruled line is devoted to each train passing over the road. The sheet is ruled vertically in columns showing:—

1. Designating number of engine.
2. Schedule number of train.
3. Schedule time of leaving terminus.
4. Number of cars in the train.
5. Name of conductor.
6. Name of engineer.

The remaining columns have the names of the several stations in their consecutive order printed at the top, with distances, etc. These columns are filled up, as the train passes over the road, by setting down the actual time of passing each station, as reported by the operator at that station, in its appropriate column. The six columns first mentioned are written up when the train starts from the initial station. A separate sheet is of course required for each day's work.

The system of controlling trains by telegraph and signals, which has been described, does not dispense with nor supersede any of the precautions previously in use, or which are used on roads not provided with such a system. A train stopped or delayed on the main track is not permitted to depend upon the station signal to hold the succeeding train, but is required to send back a warning signal at once. Thus it would seem that only by the grossest negligence, or disobedience of positive orders, on the part of two distinct persons simultaneously, is any collision liable to take place. This system is immeasurably preferable to the one in use on many roads, especially in New England, in which a danger signal is merely displayed for a given number of minutes after the passage of each train. This is not sufficient to insure absolute safety. The attendant may neglect to make the signal; the engineer may fail to observe it; and, even if made and observed, and the proper time has elapsed, the preceding train may have broken down, or stopped on the road for some cause, and in the confusion attending the accident no warning may be sent back, or if sent back may not be seen by the engineer of the following train.

On the New York & Philadelphia railroad two operators, one for day and one for night service, are employed at each signal station, and are paid at the average rate of about \$40 per month. At many of the less important stations, these operators also officiate as station-agents or ticket-sellers.

Two telegraph wires are required to operate this system, one of them being continuous throughout the length of the route, and used by all stations for reporting trains to headquarters, and for the general business of the road, and the other used exclusively for working the signals, and divided up into separate sections, of such

length as circumstances may render expedient, embracing from three to six signal stations in one circuit.

The expense of constructing a line of telegraph poles with two wires, suitable for this service is about \$175 per mile, and the telegraphic apparatus, signal and fixtures at the stations cost about \$200 each. The cost of operating it of course varies according to circumstances, but beyond the amount paid for wages of operators, is very trifling.

It will be noticed that on this road safety signals are relied on to control trains, and not danger signals. In other words, where there is any liability to interruption or obstruction, such as drawbridges, crossings at grade, etc., the thing is presumed to be wrong until the engineer has positive evidence that it is right. If on the contrary a danger signal is relied on, and if, either from defect in the apparatus, or negligence on the part of the signal-man or engineer, or if from fog, smoke or any other cause, the danger signal, if made, is not seen, the result may be a terrible disaster. When a safety signal is depended upon, then if it is not made or not seen, the most serious result that will follow is an unnecessary stoppage of the train.

Thus, in the terrible disaster at the Norwalk drawbridge many years ago, if the train had been required to stop when no signal was shown indicating that the bridge was right, no harm would have been done; but the engineer, depending upon a signal that the bridge was open, which he failed to see, ran into the river with his train.

The credit of devising and introducing the system above described, is mainly due to Mr. Ashbel Welch, General President and Chief Engineer of the United Railroads of New Jersey, and many of the considerations above given were embodied in the report of a committee on safety signals and regulations some two or three years since, of which he was chairman. For controlling the movements of trains upon an important double-track road, it would seem difficult to devise a system which combines convenience and safety in a greater degree than the one under consideration.

Very respectfully,

F. L. POPE.

THE BLOCK SYSTEM IN ENGLAND.

Mr. Alfred Watkins, an English railway superintendent, has published a pamphlet, in which he thus describes the "block system" of signaling in use on the South-eastern Railway,—“a plan so efficient,” says the “Economist,” “that for three years it has enabled that railway to be almost alone in its exemption from even minor casualties.”

“The true objects to be attained in unimpeachable train signaling are,—I presume to consider,—first, that no train shall be allowed to leave one signal station until that signal station has asked leave from the signal station in advance, and such second signal station has replied in the affirmative; second, that when the train has been so allowed to leave, the sending station shall inform the receiving station that the train has left, and the receiving station shall acknowledge that he has been so informed; third, that the signals of danger shall not be lowered until this process has been gone through; fourth, that a record, taken down at the moment, shall be kept in each signal box of the time of all signals.

“These four conditions complied with will secure safety from collision, so far as it can be secured by human agency. These conditions can only be realized in our modern practice by the use of the telegraph and the absolute ‘block’ system. They are, and have long since been, realized on every part of the South-eastern system. I know of no other railways where the *whole* of the system is in application, except on the South-eastern and London, Chatham & Dover. These two railways had no accident to report last year, whereas the greatest and most prosperous of our railways—the London & North-western, Lancashire & Yorkshire, and North-eastern—contributed 64 out of 122 accidents, which disfigured the railway calendar of the whole empire. Again, an electrical means of communications—electrical, because in no other way can an instantaneous and certain signal or message be conveyed—should be established, in the case of trains running long distances, between the driver and the guard. I now proceed to describe the system by which the four essential conditions which I have laid down are and have been secured. On the South-eastern the *personnel* of the signal box or station consists not merely of the ‘ministering’ but also of the ‘recording’ angel. The signalman, specially selected for intelligence, and paid good wages, is accompanied by a youth who must understand, having been care-

fully taught, the use of the telegraph, signal and speaking instruments—who records, with the clock before him, the exact time of all signals given and received.

“The signal box is specially constructed, and placed so as to give a full view of the line and outside signals. It is made comfortable and warm; it is well lighted at night; it contains a clock, the telegraphic instruments, the levers of the points, connected with the signals by the ‘locking’ apparatus, and is furnished with a box of fog signals, and with hand signal lamp and signal flags.”

EXPENSES OF OFFICE
FOR THE YEAR ENDING DECEMBER 31, 1871.

Rent of office and water,	\$1,104 00
Care of office and messenger,	181 99
Fuel and ice,	119 80
Office furniture,	20 00
Carpenter work,	15 20
Newspapers, books and maps, &c.,	97 75
Postage and express,	95 90
Stationery,	63 10
Services of experts and other agents,	882 70
Sundry incidentals,	9 35
	<hr/>
	\$2,980 07

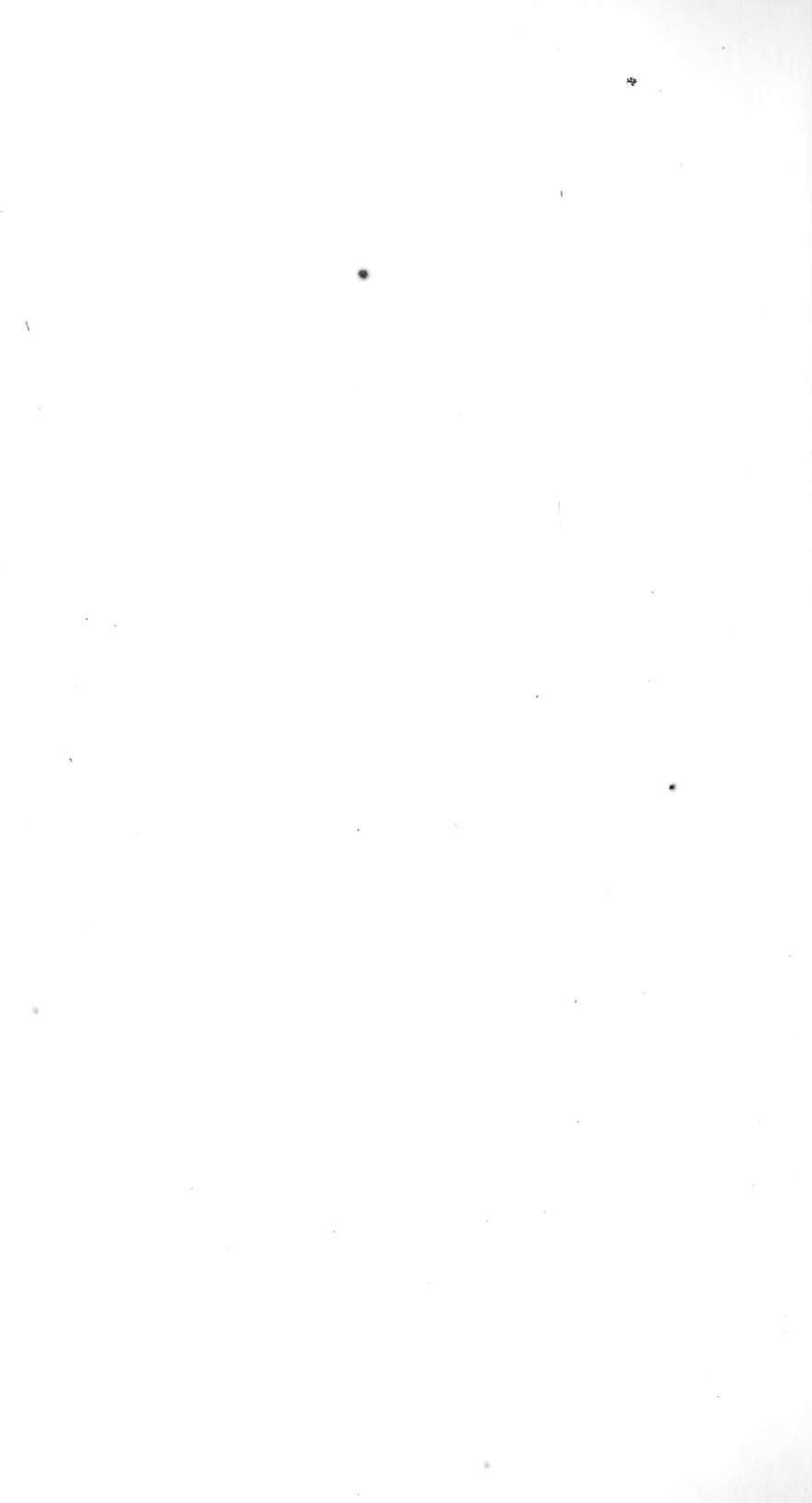
Received of railroad companies for printing their annual reports,
and paid into the treasury of the Commonwealth, . . . \$1,440 00

BOARD OF RAILROAD COMMISSIONERS.

JAMES C. CONVERSE, Boston,	Term expires July, 1872.
CHARLES F. ADAMS, Jr, Quincy,	“ “ July, 1873.
ALBERT D. BRIGGS, Springfield,	“ “ July, 1874.

Clerk.—WM. A. CRAFTS, Boston.

Office, No. 7 Pemberton Square, Boston.



TABULATED STATEMENT

COMPILED FROM

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Abstract prepared from the Returns of the several Railroad Corporations in Massachusetts, for the year ending September 30, 1871.

Number.	NAME OF CORPORATION.	A. CAPITAL STOCK.			
		1.—Authorized by Charter.	2.—Authorized by votes of Company.	3.—Amount paid in.	4.—Proportion for Massachusetts.
1	Athol and Enfield, ¹	\$700,000 00	\$500,000 00	\$480,700 00	\$480,700 00
2	Attleborough Branch,	130,000 00	130,000 00	129,200 00	129,200 00
3	Berkshire, ²	800,000 00	600,000 00	600,000 00	600,000 00
4	Boston and Albany,	27,325,000 00	20,000,000 00	19,664,100 00	15,831,746 26
5	Boston, Barre and Gardner, ¹	1,000,000 00	800,000 00	684,030 00	684,030 00
6	Boston, Clinton and Fitchburg,	1,503,800 00	—	872,600 00	872,600 00
7	Boston, Hartford and Erie, ³	—	—	—	—
8	Boston and Lowell,	3,380,000 00	3,008,000 00	2,233,000 00	2,233,000 00
9	Boston and Maine,	7,000,000 00	5,000,000 00	4,921,274 52	2,527,542 58
10	Boston and Providence,	4,000,000 00	3,950,000 00	3,950,000 00	3,217,888 01
11	Cape Cod,	1,500,000 00	1,362,800 00	817,680 00	817,680 00
12	Cheshire,	2,153,300 00	2,153,300 00	2,083,925 00	210,265 28
13	Connecticut River,	2,250,000 00	1,700,000 00	1,700,000 00	1,700,000 00
14	Danvers, ⁴	100,000 00	67,500 00	67,500 00	67,500 00
15	Dorchester and Milton, ⁵	130,000 00	73,300 00	73,340 00	73,340 00
16	Duxbury and Cohasset, ⁶	450,000 00	350,000 00	350,000 00	350,000 00
17	Eastern,	6,160,000 00	4,500,000 00	4,262,600 00	4,262,600 00
18	Essex Branch, ¹	200,000 00	75,000 00	54,000 00	54,000 00
19	Fall River, Warren and Providence, ⁷	150,000 00	150,000 00	150,000 00	93,781 90
20	Fitchburg, ⁸	4,000,000 00	4,000,000 00	4,000,000 00	3,947,372 77
21	Framingham and Lowell, ⁹	1,500,000 00	500,000 00	493,839 94	493,839 94
22	Hanover Branch, ¹⁰	160,000 00	123,300 00	123,300 00	123,300 00
23	Hartford and New Haven, ¹¹	6,500,000 00	6,500,000 00	5,000,000 00	376,602 54

24	Horn Pond Branch, ¹²	\$40,000 00	\$10,000 00	\$2,000 00	\$2,000 00
25	Holyoke and Westfield, ¹	350,000 00	200,000 00	200,000 00	200,000 00
26	Lowell and Lawrence, ¹²	300,000 00	200,000 00	200,000 00	200,000 00
27	Mansfield and Framingham, ¹³	600,000 00	300,000 00	290,780 00	290,780 00
28	Massachusetts Central, ¹	6,000,000 00	3,000,000 00	133,049 00	133,049 00
29	Middleborough and Taunton,	150,000 00	150,000 00	148,075 00	148,075 00
30	Milford and Woonsocket, ¹⁴	100,000 00	82,500 00	82,450 00	82,450 00
31	Monadnock, ¹⁵	300,000 00	250,000 00	197,500 00	25,485 00
32	Mount Tom and Easthampton, ¹	100,000 00	50,000 00	26,000 00	26,000 00
33	Nashua and Lowell,	800,000 00	800,000 00	800,000 00	510,344 85
34	New Bedford and Taunton,	800,000 00	800,000 00	500,000 00	500,000 00
35	Newburyport, ⁴	430,000 00	202,100 00	220,340 02	220,340 02
36	New Haven and Northampton,	3,000,000 00	2,100,000 00	2,100,000 00	691,869 50
37	New London Northern, ¹⁶	2,000,000 00	968,400 00	968,400 00	426,096 00
38	Norwich and Worcester,	2,825,000 00	2,825,000 00	2,364,400 00	788,133 33
39	Old Colony and Newport,	6,500,000 00	5,000,000 00	5,000,020 00	4,487,464 69
40	Pittsfield and North Adams, ¹⁷	500,000 00	450,000 00	450,000 00	450,000 00
41	Providence and Worcester,	3,000,000 00	3,000,000 00	2,000,000 00	961,228 54
42	Salem and Lowell, ¹²	400,000 00	243,300 00	243,305 00	243,305 00
43	South Reading Branch, ¹⁸	300,000 00	300,000 00	209,532 73	209,532 73
44	South Shore,	600,000 00	600,000 00	259,685 00	259,685 00
45	Stockbridge and Pittsfield ²	550,000 00	550,000 00	448,700 00	448,700 00
46	Stony Brook, ¹⁹	300,000 00	300,000 00	294,100 00	294,100 00
47	Stoughton Branch, ²⁰	150,000 00	85,400 00	85,400 00	85,400 00
48	Taunton Branch,	450,000 00	450,000 00	450,000 00	450,000 00
49	Vermont and Massachusetts,	3,200,000 00	2,860,000 00	2,860,000 00	2,502,500 00
50	Ware River, ²¹	1,000,000 00	950,000 00	490,900 00	490,900 00
51	West Stockbridge, ²	75,000 00	39,600 00	39,600 00	39,600 00
52	Worcester and Nashua,	2,100,000 00	1,510,200 00	1,425,400 00	1,218,562 60
Total,		\$108,012,100 00	\$83,819,700 00	\$75,202,726 21	\$55,532,590 54

NOTE.—For Notes see end of Tables.

Abstract of Returns of Railroad Corporations—Continued.

Number.	NAME OF CORPORATION.	B. DEBT.				8.—Proportion for Massachusetts.
		5.—Funded.	6.—Unfunded.	7.—Total.		
1	Athol and Enfield,	\$91,200 00	—	\$91,200 00	\$91,200 00	
2	Attleborough Branch,	—	—	None.	—	
3	Berkshire,	—	—	None.	—	
4	Boston and Albany,	821,500 00	\$900,000 00	1,721,500 00	1,330,928 00	
5	Boston, Barre and Gardner,	—	2,000 00	2,000 00	2,000 00	
6	Boston, Clinton and Fitchburg,	916,000 00	139,464 34	1,055,464 34	1,055,464 34	
7	Boston, Hartford and Erie,	—	—	—	—	
8	Boston and Lowell,	237,000 00	1,331,500 00	1,568,500 00	1,568,500 00	
9	Boston and Maine,	—	190,000 00	190,000 00	114,710 88	
10	Boston and Providence,	—	—	None.	—	
11	Cape Cod,	177,000 00	98,824 50	275,824 50	275,824 50	
12	Cheshire,	809,400 00	—	809,400 00	132,937 59	
13	Connecticut River,	250,000 00	132,300 00	382,300 00	382,300 00	
14	Danvers,	150,000 00	—	150,000 00	150,000 00	
15	Dorchester and Milton,	—	58,448 07	58,448 07	58,448 07	
16	Duxbury and Cohasset,	—	—	None.	—	
17	Eastern,	2,987,400 00	1,139,326 63	4,126,726 63	4,126,726 63	
18	Essex Branch,	—	—	None.	—	
19	Fall River, Warren and Providence,	200,000 00	272,607 34	472,607 34	294,623 42	
20	Fitchburg,	—	—	None.	—	
21	Framingham and Lowell,	477,500 00	100,707 53	578,207 53	578,207 53	
22	Hanover Branch,	50,000 00	—	50,000 00	50,000 00	
23	Hartford and New Haven,	754,000 00	—	754,000 00	56,791 66	
24	Horn Pond Branch,	—	—	None.	—	

25	Holyoke and Westfield,	\$200,000 00	-	\$200,000 00	\$200,000 00
26	Lowell and Lawrence,	66,700 00	-	66,700 00	66,700 00
27	Mansfield and Framingham,	300,000 00	\$142,812 98	442,812 98	442,812 98
28	Massachusetts Central,	-	850 00	850 00	850 00
29	Middleborough and Taunton,	-	8,235 22	8,235 22	8,235 22
30	Milford and Woonsocket,	-	29,500 00	29,500 00	29,500 00
31	Monadnock,	-	99,825 14	99,825 14	1,485 30
32	Mount Tom and Easthampton,	-	-	None.	-
33	Nashua and Lowell,	-	64,325 00	64,325 00	64,325 00
34	New Bedford and Taunton,	171,500 00	-	171,500 00	171,500 00
35	Newburyport,	300,000 00	-	300,000 00	300,000 00
36	New Haven and Northampton,	1,400,000 00	55,000 00	1,455,000 00	479,367 00
37	New London Northern,	699,000 00	37,500 00	736,500 00	324,060 00
38	Norwich and Worcester,	759,000 00	100,000 00	859,000 00	286,333 33
39	Old Colony and Newport,	2,941,000 00	241,851 58	3,182,851 58	2,856,573 88
40	Pittsfield and North Adams,	-	-	None.	-
41	Providence and Worcester,	300,000 00	25,000 00	325,000 00	111,401 47
42	Salem and Lowell,	226,900 00	-	226,900 00	226,900 00
43	South Reading Branch,	-	95,547 25	95,547 25	95,547 25
44	South Shore,	150,000 00	-	150,000 00	150,000 00
45	Stockbridge and Pittsfield,	-	-	None.	-
46	Stony Brook,	-	-	None.	-
47	Stoughton Branch,	-	7,000 00	7,000 00	7,000 00
48	Taunton Branch,	-	65,292 00	65,292 00	65,292 00
49	Vermont and Massachusetts,	750,000 00	189,732 30	939,732 30	822,220 00
50	Ware River,	462,000 00	-	462,000 00	462,000 00
51	West Stockbridge,	-	-	None.	-
52	Worcester and Nashua,	200,000 00	-	200,000 00	200,000 00
Total,		\$16,847,100 00	\$5,527,649 88	\$22,374,749 88	\$17,651,766 05

Abstract of Returns of Railroad Corporations—Continued.

Number.	NAME OF CORPORATION.	C. COST AND EQUIPMENT.			
		10.—Road.	10.—Equipment.	11.—Total.	12.—Proportion for Massachusetts.
1	Athol and Enfield,	—	—	—	—
2	Attleborough Branch,	—	—	—	—
3	Berkshire,	\$500,000 00	\$100,000 00	\$600,000 00	\$600,000 00
4	Boston and Albany,	19,052,459 42	3,836,337 78	22,888,797 20	17,770,912 39
5	Boston, Barre and Gardner,	616,196 27	28,113 01	644,309 28	644,309 28
6	Boston, Clinton and Fitchburg,	1,221,520 35	548,676 97	1,770,197 32	1,770,197 32
7	Boston, Hartford and Erie,	—	—	—	—
8	Boston and Lowell,	2,469,959 76	183,345 36	2,653,305 12	2,653,309 12
9	Boston and Maine,	4,396,255 31	881,694 27	5,277,949 58	2,717,111 37
10	Boston and Providence,	3,636,714 42	207,400 00	3,844,114 42	3,131,627 77
11	Cape Cod,	1,078,994 05	184,044 73	1,263,038 78	1,263,038 78
12	Cheshire,	2,337,707 22	351,599 84	2,689,307 06	281,529 27
13	Connecticut River,	1,917,185 63	229,813 89	2,146,999 52	2,146,999 52
14	Danvers,	244,456 02	—	244,456 02	244,456 02
15	Dorchester and Milton,	136,372 77	—	136,372 77	136,372 97
16	Duxbury and Cohasset,	310,407 57	—	310,407 57	310,407 57
17	Eastern,	5,665,630 49	1,490,698 55	7,146,329 04	7,146,329 04
18	Essex Branch,	—	—	—	—
19	Fall River, Warren and Providence,	330,597 85	—	330,597 85	195,400 55
20	Fitchburg,	3,440,000 00	560,000 00	4,000,000 00	3,947,372 77
21	Framingham and Lowell,	797,683 07	116,000 00	913,683 07	913,683 07
22	Hanover Branch,	174,389 24	37,050 00	211,439 24	211,439 24
23	Hartford and New Haven,	4,565,782 93	800,000 00	5,365,782 93	404,153 41
24	Horn Pond Branch,	13,075 52	—	13,075 52	13,075 52

25	Holyoke and Westfield,	\$336,945 27	—	\$30,275 28	\$336,945 27	\$336,945 27
26	Lowell and Lawrence,	332,882 84	•	—	363,158 12	363,158 12
27	Mansfield and Framingham,	756,145 62	•	—	756,145 62	756,145 62
28	Massachusetts Central,	—	•	—	—	—
29	Middleborough and Taunton,	134,920 93	•	40,083 74	175,004 67	175,004 67
30	Milford and Woonsocket,	119,705 82	•	—	119,705 82	119,705 82
31	Monadnock,	339,555 20	•	13,300 00	352,855 20	45,492 63
32	Mount Tom and Easthampton,	39,478 38	•	—	39,478 38	39,478 38
33	Nashua and Lowell,	741,874 67	•	113,406 16	855,280 83	545,610 23
34	New Bedford and Taunton,	425,318 29	•	74,691 71	500,010 00	500,010 00
35	Newburyport,	597,386 33	•	—	597,386 33	597,386 33
36	New Haven and Northampton,	2,269,746 90	•	762,011 12	3,031,758 07	999,177 47
37	New London Northern,	—	•	—	—	—
38	Norwich and Worcester,	2,463,982 64	•	149,711 57	2,613,694 21	871,231 40
39	Old Colony and Newport,	7,132,257 63	•	791,450 53	7,923,708 16	7,111,435 65
40	Pittsfield and North Adams,	432,437 24	•	11,247 43	443,684 67	443,684 67
41	Providence and Worcester,	1,656,505 83	•	575,283 95	2,231,789 78	1,072,630 01
42	Salem and Lowell,	386,425 45	•	82,543 39	468,968 84	468,968 84
43	South Reading Branch,	299,468 36	•	—	299,468 36	299,468 36
44	South Shore,	462,166 62	•	39,426 34	501,592 95	501,592 95
45	Stockbridge and Pittsfield,	550,000 00	•	—	550,000 00	550,000 00
46	Stony Brook,	294,100 00	•	—	294,100 00	294,100 00
47	Stoughton Branch,	104,741 01	•	17,200 00	121,941 01	121,941 01
48	Taunton Branch,	516,630 26	•	81,434 94	598,065 20	598,065 20
49	Vermont and Massachusetts,	3,242,793 31	•	272,533 64	3,515,326 95	3,109,977 79
50	Ware River,	891,958 37	•	—	891,958 37	891,958 37
51	West Stockbridge,	39,600 00	•	—	39,600 00	39,600 00
52	Worcester and Nashua,	1,782,747 87	•	258,423 55	2,041,171 42	1,889,587 37
Total,		\$79,245,162 73	•	\$12,867,797 80	\$92,112,960 53	\$69,244,080 95

Abstract of Returns of Railroad Corporations—Continued.

Number.	NAME OF CORPORATION.	D.			E.	
		MEANS APPLIED TO CONSTRUCTION, EQUIPMENT AND PURCHASE OF PROPERTY.			EXPENSES.	
		13.—Income.	14.—Total.	15.—Proportion for Massachusetts.	Cost of Fuel.	
					16.—Wood.	17.—Coal.
1	Athol and Enfield,	-	\$521,448 47	\$521,448 47	-	-
2	Attleborough Branch,	-	-	-	-	-
3	Berkshire,	-	600,000 00	600,000 00	-	-
4	Boston and Albany,	\$1,958,919 93	23,344,519 93	18,049,982 81	\$126,885 78	\$614,942 96
5	Boston, Barre and Gardner,	-	-	-	147 00	-
6	Boston, Clinton and Fitchburg,	43,049 05	1,971,113 34	1,971,113 34	24,622 50	55,339 59
7	Boston, Hartford and Erie,	-	-	-	1,828 30	78,007 99
8	Boston and Lowell,	183,300 12	3,984,800 12	3,984,800 12	32,630 46	83,124 15
9	Boston and Maine,	-	5,933,164 06	2,710,729 48	56,963 44	128,403 48
10	Boston and Providence,	-	3,844,114 42	3,131,627 77	8,250 00	91,594 54
11	Cape Cod,	350,000 00	1,515,018 78	1,515,018 78	1,896 51	19,250 00
12	Cheshire,	642,133 73	3,604,833 73	363,374 23	87,033 92	32,589 52
13	Connecticut River,	65,799 52	2,148,099 52	2,148,099 52	27,604 99	21,208 04
14	Danvers,	-	-	-	-	-
15	Dorchester and Milton,	-	136,372 77	136,372 77	-	-
16	Duxbury and Cohasset,	-	310,407 57	310,407 57	-	589 75
17	Eastern,	-	8,481,079 97	8,481,079 97	9,499 15	139,828 59
18	Essex Branch,	-	-	-	-	-
19	Fall River, Warren and Providence,	-	330,597 85	195,400 55	-	-
20	Fitchburg,	1,000,000 00	5,000,000 00	4,947,872 77	27,524 56	81,252 87
21	Framingham and Lowell,	-	913,683 07	913,683 07	-	-
22	Hanover Branch,	38,139 49	211,439 49	211,439 49	200 00	1,700 00
23	Hartford and New Haven,	-	5,365,782 93	404,153 41	2,750 00	83,248 41
24	Horn Pond Branch,	-	15,238 46	15,238 46	-	-

Abstract of Returns of Railroad Corporations—Continued.

Number.	NAME OF CORPORATION.	E.—EXPENSES—Con.					
		18.—Cost of Oil and Waste.		19.—Salaries, Wages and Incidentals.		20.—Gratuities and Damages.	
		Passenger Department.	Freight Department.	Switchmen, Gate-keepers, etc.	Passenger Department.	Freight Department.	
4	Boston and Albany,	\$88,247 72	\$1,033 62	1	\$13,651 77	\$14,688 03	
5	Boston, Barre and Gardner,	74 35	53,017 22	—	—	—	
6	Boston, Clinton and Fitchburg,	7,789 55	85,311 37	\$9,805 21	515 40	2,138 84	
7	Boston, Hartford and Erie,	6,517 00	147,630 33	21,236 43	4,623 11	656 94	
8	Boston and Lowell,	18,647 06	132,332 11	18,849 18	1,880 25	6,317 64	
9	Boston and Maine,	20,506 79	145,331 59	55,477 32	11,587 43	—	
10	Boston and Providence,	14,957 89	109,212 44	28,538 05	3,444 37	2,739 81	
11	Cape Cod,	2,755 04	10,399 74	4,060 00	—	1,389 34	
12	Cheshire,	14,070 33	88,167 90	6,044 02	48 35	3,390 64	
13	Connecticut River,	5,883 51	77,191 77	—	3,968 40	164 36	
16	Duxbury and Cohasset,	—	710 45	—	—	21 50	
17	Eastern,	14,752 70	84,915 36	35,088 77	15,454 23	1,617 78	
19	Fall River, Warren and Providence,	676 39	7,999 15	1,667 60	—	—	
20	Fitchburg,	10,313 55	80,893 37	17,938 68	3,260 96	5,325 46	
22	Hanover Branch,	256 75	4,503 34	—	—	—	
23	Hartford and New Haven,	8,877 65	99,560 88	—	—	—	
29	Middleborough and Taunton,	227 73	200,183 31	420 00	—	93 85	
33	Nashua and Lowell,	8,642 35	5,721 19	8,468 47	844 75	2,838 38	
34	New Bedford and Taunton,	3,439 36	61,676 65	4,150 21	495 41	1,508 56	
36	New Haven and Northampton,	8,404 57	19,049 77	—	3,703 45	—	
37	New London Northern,	8,003 25	51,143 07	8,218 74	—	—	
38	Norwich and Worcester,	5,911 68	90,123 17	10,975 07	—	—	
39	Old Colony and Newport,	14,770 03	122,655 95	34,422 52	471 24	2,803 15	
41	Providence and Worcester,	10,808 49	125,470 33	—	150 33	400 81	

43	South Reading Branch,	.	.	.	\$4,989 99	\$868 00		
44	South Shore,	.	.	.	13,518 35	684 37		\$94 06
47	Stoughton Branch,	.	.	.	667 85	—		—
48	Taunton Branch,	.	.	.	2,267 77	3,175 79		908 64
49	Vermont and Massachusetts,	.	.	.	4,055 04	8,522 25	\$29,780 94	2,020 58
52	Worcester and Nashua,	.	.	.	3,924 37	3,484 03		3,540 69
	Total,	.	.	.	\$287,132 08	\$1,767,218 41	\$93,880 39	\$52,659 06

NOTE—Numbers 1, 2, 3, 14, 15, 18, 21, 24, 25, 26, 27, 28, 30, 31, 32, 35, 40, 42, 45, 46, 50 and 51, included in other returns, or not received. See notes, p. 320.

¹ Total \$1,559,767.92.

² Total \$657.60.

³ Total \$119,996.17.

⁴ Total \$4,974.17.

⁵ Total \$792.53.

Abstract of Returns of Railroad Corporations—Continued.

Number.	NAME OF CORPORATION.	F. TAXES PAID DURING THE YEAR.				G. GROSS INCOME.	
		21.—United States, including Stamps.	22.—State.	23.—Local.	24.—Total.	25.—Passengers.	26.—Freight.
3	Berkshire,	\$869 20	\$6,948 00	—	\$7,817 20	—	—
4	Boston and Albany,	—	235,229 70	\$119,695 21	354,924 91	\$2,776,405 46	\$4,747,180 21
5	Boston, Barre and Gardner,	—	19 95	39 95	59 90	1,455 40	144 00
6	Boston, Clinton and Fitchburg,	—	5,751 62	713 33	7,331 67	188,286 45	244,155 57
7	Boston, Hartford and Erie,	866 72	—	—	866 72	322,955 34	364,487 61
8	Boston and Lowell,	—	19,445 63	28,039 31	47,484 94	529,390 13	650,913 02
9	Boston and Maine,	15,752 28	71,361 06	18,860 80	105,974 14	1,105,862 31	778,841 69
10	Boston and Providence,	—	44,148 70	31,106 19	75,254 89	761,517 98	604,196 39
11	Cape Cod,	1,675 10	11,891 15	429 39	13,995 64	195,701 07	70,514 02 ¹
12	Cheshire,	1,465 96	24,088 06	1,044 52	26,598 54	223,754 44	530,588 27
13	Connecticut River,	3,227 35	40,800 49	2,584 32	46,612 16	319,462 33	376,701 51 ¹
16	Duxbury and Cohasset,	—	—	—	—	7,764 50	783 06
17	Eastern,	17,278 30	72,354 75	24,220 01	113,853 06	1,267,184 06	489,854 47
19	Fall River, Warren and Providence,	—	—	403 19	403 19	30,845 91	933 42
20	Fitchburg,	1,318 62	53,471 11	16,865 37	71,655 10	510,126 41	755,836 80
22	Hanover Branch,	212 50	882 40	—	1,094 90	38,210 87	18,059 84
23	Hartford and New Haven,	23,534 52	—	1,916 72	25,451 24	836,624 42	738,425 04
24	Horn Pond Branch,	—	30 88	—	30 88	—	—
26	Lowell and Lawrence,	402 95	2,795 86	—	3,198 81	—	—
29	Middleborough and Taunton,	74 68	710 97	16 43	802 08	12,628 28	21,698 89
30	Milford and Woonsocket,	—	684 30	194 76	879 06	—	—
33	Nashua and Lowell,	2,241 08	11,857 34	8,863 04	22,961 46	237,841 97	292,439 19
34	New Bedford and Taunton,	741 99	6,659 35	855 07	8,256 41	156,947 73	93,304 90
36	New Haven and Northampton,	—	22,247 81	—	22,247 81	190,451 60	334,815 98

37	New London Northern, .	\$3,650 09	\$15,365 34	\$600 88	\$19,616 31	\$214,895 20	\$263,783 77
38	Norwich and Worcester, .	6,356 92	30,462 27	1,022 42	37,841 61	237,698 28	475,804 32
39	Old Colony and Newport, .	5,921 04	47,297 75	23,773 88	76,992 67	1,020,573 16	525,812 57
41	Providence and Worcester, .	5,510 35	23,475 01	12,492 28	41,477 64	345,120 53	464,830 31
42	Salem and Lowell, .	84 66	670 92	-	755 58	-	-
43	South Reading Branch, .	-	-	-	-	5,678 60	7,688 90
44	South Shore, .	353 17	1,588 08	240 90	2,182 15	62,548 89	16,090 80
45	Stockbridge and Pittsfield, .	648 34	5,195 94	-	5,844 28	-	-
47	Stoughton Branch, .	163 22	1,097 63	-	1,260 85	11,898 90	6,819 20
48	Taunton Branch, .	441 51	3,094 73	1,166 62	4,702 86	80,430 50	60,696 78
49	Vermont and Massachusetts, .	327 95	18,368 22	3,304 20	22,000 37	195,917 35	254,614 65
51	West Stockbridge, .	38 53	305 71	-	344 24	-	-
52	Worcester and Nashua, .	6,410 43	28,070 54	4,016 91	38,497 88	191,798 11	359,716 32
	Total,	\$105,539 06	\$806,371 27	\$302,465 70	\$1,220,737 15	\$12,079,976 18	\$13,549,731 50

NOTE.—Numbers 1, 2, 14, 15, 18, 21, 25, 27, 28, 31, 32, 35, 40, 46 and 50, included in other returns, or not received. See notes, p. 320.

And from other sources.

Abstract of Returns of Railroad Corporations—Continued.

Number.	NAME OF CORPORATION.	G.—GROSS INCOME—Con.				H.	I.
		27.—Rents.	28.—Mails.	29.—Express.	30.—Total.	31.—Expense of Operating.	32.—Interest Paid.
3	Berkshire,	\$42,000 00	-	-	\$42,000 00	-	-
4	Boston and Albany,	190,081 73	\$73,185 47	\$175,489 53	7,962,342 40	\$5,807,359 44	\$111,378 41 ¹
5	Boston, Barre and Gardner,	100 00	-	-	4,528 81 ²	1,394 42	-
6	Boston, Clinton and Fitchburg,	5,849 17	4,246 07	5,265 00	447,802 26	367,350 08	64,696 63
7	Boston, Hartford and Erie,	-	3,198 99	1,210 00	691,851 94	556,517 34	-
8	Boston and Lowell,	-	6,580 53	19,223 95	1,206,107 63	953,843 22	28,860 73
9	Boston and Maine,	29,020 36	14,567 50	39,456 56	1,994,689 23 ³	1,420,572 29	25,916 08
10	Boston and Providence,	12,398 44	6,145 51	26,979 27	1,415,480 86 ⁴	985,019 67	-
11	Cape Cod,	19,960 51	13,712 45	9,040 88	787,815 07 ⁵	231,958 47	13,937 05
12	Cheshire,	-	7,500 00	-	308,928 93	630,165 76	40,997 15
13	Connecticut River,	10,071 02	6,076 50	13,080 47	725,391 83	526,234 43	20,165 26
16	Duxbury and Cohasset,	-	-	79 63	8,627 19	7,911 02	-
17	Eastern,	8,000 00	13,636 75	92,962 01 ⁶	1,871,637 29	1,236,328 63	236,352 86
19	Fall River, Warren and Providence,	-	262 50	1,095 46	33,137 29	26,978 96	13,846 82
20	Fitchburg,	18,013 21	9,676 81	27,337 44	1,327,341 16 ⁷	1,010,603 23	-
22	Hanover Branch,	-	150 00	6,240 97	62,661 68	41,419 58	4,832 83
23	Hartford and New Haven,	10,721 57	21,458 57	40,965 55	1,648,195 15	1,050,963 08	47,786 34
26	Lowell and Lawrence,	22,688 05	-	-	22,688 05	3,318 25	3,769 50
29	Middleborough and Taunton,	-	475 00	-	35,042 83 ⁸	28,061 42	-
30	Milford and Woonsocket,	5,000 00	-	-	5,000 00	-	1,907 75
33	Nashua and Lowell,	-	2,956 47	8,636 82	544,612 95 ⁹	442,198 35	-
34	New Bedford and Taunton,	470 25	3,281 62	4,414 03	258,418 53	205,859 47	10,280 81
36	New Haven and Northampton,	1,274 63	7,516 82	12,150 00	546,209 03	395,693 86	104,334 64
37	New London Northern,	7,776 95	9,025 00	9,854 61	505,335 53	366,337 54	47,848 71

38	Norwich and Worcester,	\$614 57	\$3,000 00	\$32,000 00	\$749,117 17	\$487,370 63	\$49,371 44
39	Old Colony and Newport,	-	16,361 42	74,783 86	1,671,478 51 ¹⁰	1,072,242 63	190,823 36
41	Providence and Worcester,	3,422 86	3,880 00	11,965 09	829,218 79	623,406 16	17,678 60
42	Salem and Lowell,	17,711 30	-	-	17,711 30	-	13,614 00
43	South Reading Branch,	-	-	-	13,367 50	20,379 30	-
44	South Shore,	439 88	1,373 73	2,120 21	82,573 51	66,206 63	8,715 45
45	Stockbridge and Pittsfield,	31,409 00	-	-	31,409 00	-	62 14
46	Stony Brook,	16,942 00	-	-	16,942 00	-	-
47	Stoughton Branch,	-	199 75	458 83	19,376 68	15,300 64	619 50
48	Taunton Branch,	898 00	1,500 00	-	148,736 11 ¹¹	106,115 21	-
49	Vermont and Massachusetts,	90,845 46	9,112 50	7,487 50	562,238 08 ¹²	399,372 39	56,978 94
50	Ware River,	16,315 07	-	-	16,315 07	-	15,967 01
51	West Stockbridge,	1,793 70	-	-	1,881 45	-	-
52	Worcester and Nashua,	5,697 97	4,625 00	7,926 90	569,764 30	388,697 46	7,357 14
	Total,	\$569,515 70	\$243,704 96	\$630,224 57	\$27,185,975 11	\$19,475,179 56	\$1,138,099 15

NOTE.—Numbers 1, 2, 14, 15, 18, 21, 24, 25, 27, 28, 31, 32, 35 and 40, included in other returns, or not received. See notes, p. 320.

¹ Including exchange.

⁴ Including interest and dividends \$4,243.27.

⁷ Including interest \$6,350.49.

¹⁰ And other sources \$33,947.50.

² Including interest \$2,829.41.

⁵ Including rents and miscellaneous \$25,973.36.

⁸ Including interest, &c., \$240.66.

¹¹ Including interest, &c., \$5,210.83.

³ Including interest \$26,940.81.

⁶ And miscellaneous.

⁹ Including interest \$2,738.50.

¹² Including tolls and miscellaneous \$4,259.62.

Abstract of Returns of Railroad Corporations—Continued.

Number.	NAME OF CORPORATION.	J. DIVIDENDS.		K. 35.—Net Income.	L. 36.—Assets.	M. 37.—SURPLUS.		N. 38.—Deficit.
		33.—Amount.	34.—Per Cent.			As required by Return.	As shown by Balance Sheet.	
3	Berkshire,	\$33,629 70	5 ⁹ / ₁₆	\$42,000 00	\$403 59	\$40 55	\$40 55	-
4	Boston and Albany,	2,010,097 43	10 ² / ₁₆	2,154,982 96	1,528,927 91	486,700 78	3,009,205 34	-
5	Boston, Barre and Gardner,	-	-	3,134 39	23,102 82	23,102 82	7,879 71	-
6	Boston, Clinton and Fitchburg,	3,600 00	6 ³ / ₁₆	80,452 18	198,526 89	86,735 84	43,049 05	-
7	Boston, Hartford and Erie, ¹	-	-	135,334 60	-	-	-	-
8	Boston and Lowell,	177,200 00	8	252,264 41	833,538 26	43,829 65	320,588 05	-
9	Boston and Maine,	377,500 00	8	574,116 94	1,302,787 93	601,678 74	1,107,407 82	-
10	Boston and Providence,	395,000 00	10	430,461 19	291,427 82	13,469 44	371,624 49	-
11	Cape Cod,	63,857 50	7 ⁸ / ₁₆	76,970 46	69,814 97	69,814 97	41,739 94	-
12	Cheshire,	107,692 30	5 ² / ₁₆	157,649 31	389,392 69	239,392 69	90,737 75	-
13	Connecticut River,	170,000 00	10	199,157 40	241,006 43	39,513 93	334,857 59	-
16	Duxbury and Cohasset,	-	-	716 17	40,308 60	40,308 60	716 17	-
17	Eastern,	364,408 00	8	635,308 66	1,221,759 79	326,887 30	194,325 31	-
19	F. River, Warren and Providence,	-	-	9,866 42	19,402 72	-	-	\$50,598 47
20	Fitchburg,	303,054 34	8 ² / ₁₆	316,737 93	208,209 94	131,579 17	513,427 95	-
21	Framingham and Lowell,	-	-	-	158,364 40	158,364 40	None.	-
22	Hanover Branch, ¹	-	-	21,242 10	-	-	-	-
23	Hartford and New Haven,	288,000 00	6	597,232 07	1,093,310 61	1,093,310 61	913,982 21	-
26	Lowell and Lawrence,	12,000 00	6	19,369 80	17,342 30	6,178 21	102,636 33	-
27	Mansfield and Framingham,	-	-	27,299 00	15,033 13	-	-	11,905 30
28	Massachusetts Central, ¹	-	-	-	108,677 12	108,677 12	-	8,577 40
29	Middleborough and Taunton,	5,898 00	4	6,981 41	6,062 70	-	24,597 83	3,628 52
30	Milford and Woonsocket, ¹	-	-	1,359 62	-	-	-	-
32	Mount Tom and Easthampton,	-	-	-	248 56	-	-	13,478 38

33	Nashua and Lowell,	•	\$76,000 00	10	\$102,414 60	\$128,773 08	\$20,725 06	\$156,005 89	-
34	New Bedford and Taunton,	•	40,000 00	8	52,559 06	82,121 00	32,037 57	132,686 20	-
36	New Haven and Northampton,	•	43,966 38	-	150,515 17	124,965 32	108,488 34	119,737 78	-
37	New London Northern,	•	73,446 00	8	138,997 99	110,331 74	58,091 74	63,493 83	-
38	Norwich and Worcester,	•	237,780 00	10	261,746 54	473,136 92	450,018 60	803,887 93	-
39	Old Colony and Newport,	•	306,012 96	6	599,235 88	303,517 06	785,219 36	486,956 33	-
40	Pittsfield and North Adams, ¹	•	27,000 00 ²	6	-	-	-	-	-
41	Providence and Worcester,	•	200,000 00	10	205,812 63	260,196 06	175,102 06	81,891 84	\$717 07
42	Salem and Lowell,	•	3,649 50	1 $\frac{1}{2}$	16,827 39	1,581 84	519 09	-	7,011 80
43	South Reading Branch,	•	-	-	-	29,658 06	23,835 94	8,751 83	-
44	South Shore,	•	-	-	16,366 88	23,500 51	14,819 51	106,727 47	-
45	Stockbridge and Pittsfield,	•	25,502 58	5 $\frac{1}{10}$	31,409 00	185 40	185 40	185 40	-
46	Stony Brook,	•	16,942 00	6	16,942 00	34,913 64	25,562 14	3,551 71	-
47	Stoughton Branch,	•	2,562 00	3	4,076 04	2,240 87	2,240 87	3,740 87	-
48	Taunton Branch,	•	32,000 00	8	42,620 90	64,836 16	53,460 16	49,943 10	-
49	Vermont and Massachusetts,	•	58,666 67	2 ²	162,865 69	183,122 25	159,227 75	96,128 25	-
50	Ware River, ¹	•	-	-	16,315 07	-	-	-	-
51	West Stockbridge, ¹	•	1,484 00	4	1,492 96	-	-	-	-
52	Worcester and Nashua,	•	162,750 00	10	181,066 84	137,517 08	67,647 78	137,517 08	-
	Total,	•	\$5,619,699 36	-	\$7,743,901 66	-	-	-	-

NOTE.—Numbers 1, 2, 14, 15, 18, 24, 25, 31, and 35, included in other returns, or not received. See notes, p. 320.

¹ No balance sheet returned.

² Including tax. The Boston and Albany Railroad Company also paid 6 per cent. dividend on the capital stock of the Pittsfield and North Adams Railroad Company, which is placed in the dividend column, opposite the latter Company.

³ On \$60,000 guaranteed stock.

⁴ Paid by Boston and Albany Railroad Company.

Abstract of Returns of Railroad Corporations—Continued.

Number.	NAME OF CORPORATION.	MILES RUN.				P.	43.—Number of Passengers carried during the year.	44.—Tons of Freight carried during the year.
		40.—Freight Trains.			42.—Total.			
		39.—Passenger Trains.	41.—Other Trains.	40.—Freight Trains.				
3	Berkshire,	21,127	22,133	—	43,260	71,380	162,615	
4	Boston and Albany,	1,119,037	2,875,865	100,411	4,095,313	4,744,904	2,209,332	
6	Boston, Clinton and Fitchburg,	166,203	124,416	5,400	296,019	293,104	266,297	
7	Boston, Hartford and Erie,	328,321	189,271	—	517,592	1,760,942	294,177	
8	Boston and Lowell,	357,140	310,559	—	667,699	1,767,952	548,793	
9	Boston and Maine,	694,295	365,563	33,280	1,093,138	3,873,587	486,444	
10	Boston and Providence,	378,925	197,643	10,501	587,069	2,642,903	562,565	
11	Cape Cod,	100,789	65,751	5,214	171,754	265,934	59,298	
12	Cheshire,	122,570	446,375	17,441	586,386	147,274	370,840	
13	Connecticut River,	150,226	131,805	15,319	297,350	876,481	332,542	
16	Duxbury and Cohasset,	5,897	—	—	5,897	28,136	813	
17	Eastern,	660,226	226,127	266,073	1,152,426	4,610,277	365,965	
19	Fall River, Warren and Providence,	11,154	—	—	11,154	82,136	—	
20	Fitchburg,	334,138	320,206	11,713	666,057	1,793,222	—	
22	Hanover Branch,	19,200	—	—	19,200	75,124	13,019	
23	Hartford and New Haven,	309,629	221,425	86,729	617,783	1,215,374	489,902	
29	Middleborough and Taunton,	13,772	6,886	692	21,350	35,599	31,786	
31	Monadnock,	14,091	—	2,560	16,651	31,200	5,100	
33	Nashua and Lowell,	160,454	139,526	—	299,980	794,297	246,558	
34	New Bedford and Taunton,	99,924	25,829	2,617	128,370	325,136	130,095	
36	New Haven and Northampton,	198,755	141,513	—	340,268	355,023	199,582	
37	New London Northern,	228,246	135,482	7,225	370,953	437,263	222,390	
38	Norwich and Worcester,	171,360	228,016	3,519	402,895	371,651	304,710	
39	Old Colony and Newport,	664,179	285,584	40,899	990,662	3,332,750	395,157	

41	Providence and Worcester,	.	.	.	208,420	223,492	22,760	454,672	1,398,891	452,266
43	South Reading Branch,	.	.	.	25,040	-	-	25,040	25,651	28,219
44	South Shore,	.	.	.	46,921	7,892	-	54,813	393,373	25,816
45	Stockbridge and Pittsfield,	.	.	.	27,970	27,610	-	55,580	91,870	91,206
47	Stoughton Branch,	.	.	.	16,352	-	-	16,352	124,244	36,273
48	Taunton Branch,	.	.	.	57,515	23,788	6,520	87,823	236,927	123,596
49	Vermont and Massachusetts,	.	.	.	139,333	93,190	14,546	247,069	244,819	150,376
51	West Stockbridge,	.	.	.	1,878	-	-	1,878	13,130	-
52	Worcester and Nashua,	.	.	.	92,472	216,708	5,277	314,457	356,264	328,372
	Totals,	.	.	.	6,945,559	7,052,655	658,696	14,656,910	32,816,818	8,934,104

NOTE.—Numbers 1, 2, 5, 14, 15, 18, 21, 24, 25, 26, 27, 28, 30, 32, 35, 40, 42, 46 and 50, included in other returns, or not received.
See notes, p. 320.

Abstract of Returns of Railroad Corporations—Continued.

Number.	NAME OF CORPORATION.	R. 45.—CASUALTIES.		S. 46.—LENGTH OF ROAD, BRANCHES AND SIDINGS.				
		Fatal.	Not Fatal.	Length of Main Road, Miles.		Length of Double Track.	Length of Branches, Miles.	
				Whole No.	In Mass.		Whole No.	In Mass.
1	Athol and Enfield, . . . . .	.	—	30.40	30.40	—	—	—
2	Attleborough Branch, . . . . .	.	—	3.87	3.87	—	—	—
3	Berkshire, . . . . .	.	—	21.13	21.13	—	—	—
4	Boston and Albany,	44	—	201.65	162.35	201.65	47.98	30.65
5	Boston, Barre and Gardner, . . . . .	.	—	23.38	23.38	—	—	—
6	Boston, Clinton and Fitchburg,	2	4	42.87	42.87	—	—	—
7	Boston, Hartford and Fitchburg,	3	38	61.25	51.75	12.50	51.25	43.25
8	Boston and Lowell,	8	7	26.75	26.75	26.75	13.75	13.75
9	Boston and Maine,	8	3	74.25	36.75	27.79	8.50	5.75
10	Boston and Providence,	8	2	44.	38.	44.	14.50	10.
11	Cape Cod,	—	1	71.62	71.62	—	4.90	4.90
12	Cheshire,	4	3	53.62	10.81	—	—	—
13	Connecticut River,	4	—	50.	50.	3.50	4.35	4.35
14	Danvers,	—	—	9.25	9.25	—	—	—
15	Dorchester and Milton,	—	—	3.25	3.25	—	—	—
16	Duxbury and Cohasset,	—	—	17.50	17.50	—	—	—
17	Eastern,	45	70	44.20	44.20	21.75	54.44	54.44
18	Essex Branch,	—	—	5.50	5.50	—	—	—
19	Fall River, Warren and Providence,	—	—	5.79	3.66	—	—	—
20	Fitchburg,	9	2	50.	50.	50.	43.32	33.95
21	Framingham and Lowell,	—	—	26.	26.	—	—	—
22	Hanover Branch,	—	—	7.87	7.87	—	—	—
23	Hartford and New Haven,	1	3	62.	5.88	62.	16.	—
24	Horn Pond Branch,	—	—	.65	.65	—	—	—

Abstract of Returns of Railroad Corporations—Continued.

Number.	NAME OF CORPORATION.	S.—LENGTH OF ROAD, BRANCHES AND SIDINGS—Con.				T.		
		Aggregate Length of Sidings and other Tracks, Miles.		Total Length of Tracks, Miles.		AVERAGE SPEED OF TRAINS, MILES PER HOUR.		
		Whole No.	In Mass.	Whole No.	In Mass.	47.—Express.	48.—Accommodation.	49.—Freight.
1	Athol and Enfield, .	.70	70	31.10	31.10	-	-	-
2	Attleborough Branch, .	1.	1.	4.87	4.87	-	-	-
3	Berkshire, .	1.	1.	22.13	22.13	25	25	12
4	Boston and Albany, .	102.08	84 85	553 36	440.20	32	25	15
5	Boston, Barre and Gardner, .	1.	1.	24.38	24 38	-	-	-
6	Boston, Clinton and Fitchburg, .	9.	9.	51.87	51.87	30	25	14
7	Boston, Hartford and Fitchburg, .	12.68	11.23	137.68	118.73	25	20	10
8	Boston, Lowell, .	19.	19.	86.25	86.25	30	25	10
9	Boston and Maine, .	36.46	18.	147.	88.75	30	24	12
10	Boston and Providence, .	18.	13.	120.50	106.	30	22	14
11	Cape Cod, .	4.50	4 50	81.02	81.02	24	22	13
12	Cheshire, .	10 85	2 50	64.47	13 31	25	22	10
13	Connecticut River, .	15.50	15.50	73 35	73 35	29	24	15
14	Danvers, .	-	-	9.25	9 25	-	-	-
15	Dorchester and Milton, .	-	-	3.25	3 25	-	-	-
16	Duxbury and Cohasset, .	-	-	17.50	17.50	-	20	-
17	Eastern, .	25 23	25.23	145.62	145 62	28	20	15
18	Essex Branch, .	-	-	5.50	5 50	-	-	-
19	Fall River, Warren and Providence, .	-	-	5.79	3 66	-	24	-
20	Fitchburg, .	32.63	31.16	175 95	165 11	27½	22	9½
21	Framingham and Lowell, .	1.	1.	27.	27.	-	-	-
22	Hanover Branch, .	1.	1.	8.87	8 87	-	16	-
23	Hartford and New Haven, .	23.	3 08	163.	14 83	33	27	12
24	Horn Pond Branch, .	.08	.08	.73	.73	-	-	-

Abstract of Returns of Railroad Corporations—Continued.

Number.	NAME OF CORPORATION.	U.		V.		W.	X.	Y.
		TOTAL PASSENGER MILEAGE.		TOTAL FREIGHT MILEAGE.				
		50.—Whole.	51.—To and from other roads.	52.—Whole.	53.—To and from other roads.			
3	Berkshire,	598,340	518,722	2,601,820	2,580,371	24,441	22,479	23,460
4	Boston and Albany,	98,664,038	42,467,478	227,151,089	152,225,893	184,626	184,773	4,375,505
6	Boston, Clinton and Fitchburg,	5,862,080	—	7,684,635	—	—	—	293,104
7	Boston, Hartford and Erie,	16,133,489	5,949,280	8,023,866	5,286,091	58,059	54,379	1,648,504
8	Boston and Lowell,	23,520,089	4,617,112	15,758,827	9,283,591	105,771	101,020	1,561,160
9	Boston and Maine,	55,655,987	10,648,683	18,562,370	122,103	194,856	200,380	3,283,420
10	Boston and Providence,	31,134,145	10,210,939	16,755,014	10,800,916	163,546	203,392	2,275,965
11	Cape Cod,	6,444,732	5,233,127	1,776,069	1,032,717	—	—	265,934
12	Cheshire,	5,854,640	4,402,860	20,685,772	20,085,474	42,369	40,277	24,693
13	Connecticut River,	10,444,382	3,606,942	8,275,900	7,153,064	—	—	756,597
16	Duxbury and Cohasset,	216,278	180,677	9,210	9,131	—	—	28,136
17	Eastern,	59,939,325	6,632,864	10,204,890	4,777,969	127,723	93,544	3,447,410
19	Fall River, Warren and Providence,	475,796	—	—	—	39,424	42,712	—
20	Fitchburg,	22,705,034	5,692,970	—	1	6,070	7,091	1,780,061
22	Hanover Branch,	300,496	—	52,076	—	—	—	75,124
23	Hartford and New Haven,	33,998,626	17,576,373	20,704,820	1,364,786	216,165	228,241	444,406
29	Middleborough and Taunton,	248,719	237,036	172,108	167,011	—	—	35,599
31	Monadnock,	126,700	—	16,600	1,685	—	—	—
33	Nashua and Lowell,	10,567,000	2,074,354	7,080,052	4,170,889	47,521	45,386	701,391
34	New Bedford and Taunton,	4,358,961	3,281,450	1,304,674	1,071,720	—	—	325,136
36	New Haven and Northampton,	5,225,344	1,524,721	7,792,939	3,340,762	14,108	14,124	141,946
37	New London Northern,	6,389,719	2,673,135	7,105,131	4,293,408	18,600	20,088	88,020
38	Norwich and Worcester,	6,964,663	2,281,121	11,798,918	4,839,452	48,804	63,389	127,532
39	Old Colony and Newport,	45,437,286	14,779,790	10,845,206	4,438,543	109,711	104,809	3,111,477

41	Providence and Worcester	.	.	12,858,178	1,440,214	13,855,268	7,546,368	108,565	114,832	246,483
43	South Reading Branch, .	.	.	160,840	53,147	99,417	46,864	-	-	25,651
44	South Shore, .	.	.	2,023,592	1,803,073	155,708	151,348	-	-	393,373
45	Stockbridge and Pittsfield,	.	.	1,089,770	540,120	1,003,260	983,725	-	-	91,870
47	Stoughton Branch, .	.	.	326,101	268,581	68,932	46,465	-	-	124,244
48	Taunton Branch, .	.	.	2,494,969	2,275,089	1,347,963	1,327,238	-	-	236,927
49	Vermont and Massachusetts,	.	.	5,012,527	2,581,176	3,258,783	2,578,608	-	-	244,819
51	West Stockbridge, .	.	.	39,390	28,950	-	-	-	-	-
52	Worcester and Nashua, .	.	.	5,985,235	2,529,500	11,690,038	9,063,058	37,173	22,649	237,510
Total, . . . . .		.	.	481,256,471	156,109,484	435,841,355	258,789,250	1,547,532	1,563,565	26,415,457

NOTE.—Numbers 1, 2, 5, 14, 15, 18, 21, 24, 25, 26, 27, 28, 30, 32, 35, 40, 42, 46 and 50, included in other returns, or not received. See notes, p. 320.

¹ No return. Books and papers of freight department destroyed by fire.

Abstract of Returns of Railroad Corporations—Continued.

Number.	NAME OF CORPORATION.	Z. 57.—Passengers to Boston.	A.A. 58.—Passengers from Boston.	B.B. SEASON TICKET PASSENGERS.		C.C. TONS OF FREIGHT CARRIED. 61.—From other States.
				59.—Total.	60.—To and from Boston.	
3	Berkshire,	—	—	—	—	125,930
4	Boston and Albany,	1,896,672	1,392,552	1,026,374	513,187	1,014,272
7	Boston, Hartford and Erie, Boston and Lowell,	603,289	613,548	548,314	274,157	92,034
8	Boston and Lowell,	626,506 ¹	628,594 ¹	549,878 ¹	231,647 ¹	180,202
9	Boston and Maine,	1,568,523	1,571,693	1,495,712	722,657	117,762
10	Boston and Providence,	794,232	689,317	918,661	408,306	235,336
11	Cape Cod,	—	—	27,436	—	— ²
12	Cheshire,	—	—	5,772	—	—
13	Connecticut River,	—	—	119,884	—	90,231
17	Eastern,	1,363,306	1,363,307	1,466,760	470,800	19,343
20	Fitchburg,	723,248	720,471	368,804	175,970	— ²
22	Hanover Branch,	—	—	10,920	—	—
23	Hartford and New Haven, Middleborough and Taunton, Nashua and Lowell,	—	—	266	—	65,202
29	—	—	—	5,148	—	—
33	—	281,473 ³	282,412 ³	247,047 ³	104,074 ³	80,260
34	New Bedford and Taunton, New Haven and Northampton, New London Northern,	—	—	6,708	—	—
36	—	—	—	—	—	46,184
37	Norwich and Worcester,	—	—	172,776	—	18,526
38	—	—	—	34,430	—	114,636
39	Old Colony and Newport, Providence and Worcester, South Reading Branch,	—	—	670,060	335,030	21,312
41	—	—	—	90,636	—	135,919
43	—	—	—	5,616	—	—
44	South Shore,	—	—	112,404	—	—
45	Stockbridge and Pittsfield, —	1,409,597	1,136,753	—	—	61,817

Abstract of Returns of Railroad Corporations—Continued.

Number.	NAME OF CORPORATION.	CC.—Tons of Freight Carried—Con.				DD.—Miles of Road belonging to other Companies, operated under Lease or Contract.
		62.—To other States.	63.—Within the State only.	64.—From Boston.	65.—Taken to Boston.	
3	Berkshire,	33,685	2,995	—	—	—
4	Boston and Albany,	182,005	642,387	348,423	621,478	18.65
6	Boston, Clinton and Fitchburg,	—	235,297	—	—	—
7	Boston, Hartford and Erie,	32,182	169,985	120,505	64,351	—
8	Boston and Lowell,	124,295	244,294	176,148	165,065	29.
9	Boston and Maine,	92,634	258,723	277,414	180,104	65.
10	Boston and Providence,	188,345	138,884	210,630	158,182	8.
11	Cape Cod,	—	59,298	—	—	—
12	Cheshire,	1	1	1	1	34.50
13	Connecticut River,	32,450	209,853	—	—	—
16	Duxbury and Cohasset,	—	813	—	—	—
17	Eastern,	3,870	342,752	135,646	102,955	16.55
20	Fitchburg,	1	1	1	1	—
22	Hanover Branch,	—	13,019	—	—	—
23	Hartford and New Haven,	75,248	—	—	—	—
29	Middleborough and Taunton,	—	31,786	—	—	—
33	Nashua and Lowell,	55,843	109,755	79,179	74,160	28.66
34	New Bedford and Taunton,	—	130,095	—	—	—
36	New Haven and Northampton,	51,856	15,787	—	—	—
37	New London Northern,	4,696	37,676	—	—	—
38	Norwich and Worcester,	71,763	23,189	—	—	15.50
39	Old Colony and Newport,	20,075	353,770	—	—	—
41	Providence and Worcester,	81,140	24,918	174,348	86,718	—
43	South Reading Branch,	—	28,219	24,079	—	3.88

44	South Shore, . . . . .	.	.	.	.	.	.	25,816	-	-	-	-
45	Stockbridge and Pittsfield, . . . . .	.	.	.	.	.	.	4,503	-	-	-	-
48	Taunton Branch, . . . . .	.	.	.	.	.	.	123,596	-	-	-	-
49	Vermont and Massachusetts, . . . . .	.	.	.	.	.	.	150,373	-	-	-	30.
52	Worcester and Nashua, . . . . .	.	.	.	.	.	.	91,267	-	-	-	-
	Total, . . . . .	.	.	.	.	.	.	3,469,050	1,546,372	1,453,013		249.74

NOTE.—Numbers 1, 2, 5, 14, 15, 18, 19, 21, 24, 25, 26, 27, 28, 30, 31, 32, 35, 40, 42, 46, 47, 50 and 51, included in other returns, or not received. See notes, p. 320.

¹ No return. Books and papers of freight department destroyed by fire.

Abstract of Returns of Railroad Corporations—Continued.

Number.	NAME OF CORPORATION.	EE. ROLLING STOCK.					FF. 72.—Number of Persons regular- ly employed by the Company.
		67.—Locomo- tives.	68.—Passenger Cars.	69.—Freight Cars.	70.—Mail and Baggage Cars.	71.—Other Cars.	
4	Boston and Albany,	180	133	2,964	36	598	4,422
5	Boston, Barre and Gardner,	3	1	10	1	32	—
6	Boston, Clinton and Fitchburg,	14	18	158	11	314	328
7	Boston, Hartford and Erie,	22	30	110	13	265	515
8	Boston and Lowell,	33	43	309	19	550	766
9	Boston and Maine,	49	88	351	24	888	1,210
10	Boston and Providence,	35	57	235	9	270	628
11	Cape Cod,	10	15	54	7	103	200
12	Cheshire,	27	22	252	9	158	411
13	Connecticut River,	17	23	134	9	260	382
16	Lexbury and Cohasset,	—	—	—	—	—	34
17	Eastern,	55	94	325	27	664	977
19	Fall River, Warren and Providence,	—	—	—	—	—	16
20	Fitchburg,	36	43	374	11	382	675
21	Frankingham and Lowell,	—	—	60	—	—	—
22	Hanover Branch,	2	5	7	—	5	18
23	Hartford and New Haven,	34	33	191	18	409	1,016
29	Middleborough and Taunton,	1	2	22	1	7	17
31	Monadnock,	1	—	—	—	3	25
33	Nashua and Lowell,	15	19	138	8	248	292
34	New Bedford and Taunton,	7	18	61	10	79	151
36	New Haven and Northampton,	16	15	100	5	220	375
37	New London Northern,	15	15	110	9	204	300
38	Norwich and Worcester,	20	14	256	5	386	387

39	Old Colony and Newport,	.	.	.	.	40	76	177	20	392	763
41	Providence and Worcester,	.	.	.	.	23	24	305	6	579	453
43	South Reading Branch,	.	.	.	.	-	-	-	-	-	14
44	South Shore,	.	.	.	.	3	12	4	2	11	39
47	Stoughton Branch,	.	.	.	.	1	2	-	-	2	4
48	Taunton Branch,	.	.	.	.	6	10	55	6	52	80
49	Vermont and Massachusetts,	.	.	.	.	15	21	153	7	124	302
52	Worcester and Nashua,	.	.	.	.	13	11	211	5	143	295
	Total,	.	.	.	.	693	844	7,126	278	7,288	15,095

NOTE.—Numbers 1, 2, 3, 14, 15, 18, 24, 25, 26, 27, 28, 30, 32, 35, 40, 42, 45, 46, 50 and 51, included in other returns, or not received.
See notes, p. 320.

Abstract of Returns of Railroad Corporations—Concluded.

Number.	NAME OF CORPORATION.	GG. NUMBER OF STATIONS.		HH. NUMBER OF STOCKHOLDERS.		II. 77.—Amount of Stock held in Massachusetts.
		73.—Whole No.	74.—In Mass.	75.—Whole No.	76.—In Mass.	
1	Athol and Enfield,	10	10	171	170	\$503,100 00
2	Attleborough Branch,	—	—	42	42	129,200 00
3	Berkshire,	5	5	232	116	356,900 00
4	Boston and Albany,	90	75	4,880	4,126	17,025,000 00
5	Boston, Barre and Gardner,	9	9	155	155	684,030 00
6	Boston, Clinton and Fitchburg,	22	22	644	638	869,000 00
7	Boston, Hartford and Erie,	61	55	—	—	—
8	Boston and Lowell,	27	27	880	730	1,858,000 00
9	Boston and Maine,	59	34	3,412	1,896	3,307,800 00
10	Boston and Providence,	41	37	1,519	1,175	3,111,200 00
11	Cape Cod,	29	29	1,230	1,185	—
12	Cheshire,	33	7	741	541	1,795,800 00
13	Connecticut River,	17	17	684	507	1,277,600 00
15	Dorchester and Milton,	6	6	50	50	73,300 00
16	Duxbury and Cohasset,	12	12	4	4	350,000 00
17	Eastern,	59	53	2,396	1,784	3,656,700 00
18	Essex Branch,	—	—	78	78	—
19	Fall River, Warren and Providence,	2	2	31	7	20,900 00
20	Fitchburg,	48	45	2,333	1,941	3,387,300 00
21	Framingham and Lowell,	6	6	139	137	481,000 00
22	Hanover Branch,	4	4	120	117	121,200 00
23	Hartford and New Haven,	26	2	1,080	126	658,900 00
24	Horn Pond Branch,	—	—	13	13	2,000 00
25	Holyoke and Westfield,	—	—	14	13	180,000 00

26	Lowell and Lawrence,	.	.	.	.	.	.	.	.	70	\$198,400 00
27	Mansfield and Framingham,	.	.	.	.	.	.	.	.	169	288,300 00
28	Massachusetts Central,	.	.	.	.	.	.	.	.	472	3,000,000 00
29	Middleborough and Taunton,	.	.	.	.	.	.	.	.	177	134,675 00
30	Milford and Woonsocket,	.	.	.	.	.	.	.	.	37	71,900 00
31	Monadnock,	.	.	.	.	.	.	.	.	12	113,000 00
32	Mount Tom and Easthampton,	.	.	.	.	.	.	.	.	5	35,000 00
33	Nashua and Lowell,	.	.	.	.	.	.	.	.	250	417,700 00
34	New Bedford and Taunton,	.	.	.	.	.	.	.	.	259	464,700 00
36	New Haven and Northampton,	.	.	.	.	.	.	.	.	46	183,800 00
37	New London Northern,	.	.	.	.	.	.	.	.	23	112,000 00
38	Norwich and Worcester,	.	.	.	.	.	.	.	.	338	1,640,900 00
39	Old Colony and Newport,	.	.	.	.	.	.	.	.	2,679	4,393,300 00
40	Pittsfield and North Adams,	.	.	.	.	.	.	.	.	—	—
41	Providence and Worcester,	.	.	.	.	.	.	.	.	252	799,800 00
42	Salem and Lowell,	.	.	.	.	.	.	.	.	59	240,900 00
43	South Reading Branch,	.	.	.	.	.	.	.	.	3	209,532 73
44	South Shore,	.	.	.	.	.	.	.	.	27	259,555 00
45	Stockbridge and Pittsfield,	.	.	.	.	.	.	.	.	160	282,100 00
46	Stony Brook,	.	.	.	.	.	.	.	.	226	277,800 00
47	Stoughton Branch,	.	.	.	.	.	.	.	.	66	85,400 00
48	Taunton Branch,	.	.	.	.	.	.	.	.	144	430,700 00
49	Vermont and Massachusetts,	.	.	.	.	.	.	.	.	783	2,626,300 00
50	Ware River,	.	.	.	.	.	.	.	.	184	—
51	West Stockbridge,	.	.	.	.	.	.	.	.	20	38,950 00
52	Worcester and Nashua,	.	.	.	.	.	.	.	.	705	1,230,545 00
Total,										22,717	\$57,379,187 73 ¹
										30,211	
										678	
										849	

NOTE.—Numbers 14 and 35, included in returns of Boston and Maine (9). See notes, p. 320.

¹ The Boston, Hartford & Erie, the Cape Cod, the Essex Branch, the Pittsfield & North Adams and the Ware River Railroad Companies are not included in this aggregate.

NOTES TO TABULATED STATEMENT COMPILED FROM RAILROAD RETURNS.

- ¹ In process of construction.
- ² The Berkshire(3), Stockbridge and Pittsfield(45), and West Stockbridge(51) roads, are leased to, and operated by the Housatonic Railroad Company, of Connecticut.
- ³ The return of the Boston, Hartford and Erie(7) road is made by the Trustees. It contains no information as to the financial condition of the Company, or the amount of capital stock.
- ⁴ The Danvers(14) and Newburyport(35) roads are equipped and operated by the Boston and Maine Railroad Company.
- ⁵ The Dorchester and Milton Branch(15) is equipped and operated by the Old Colony and Newport Railway Company.
- ⁶ The equipment of the Duxbury and Cohasset road(16) is furnished by the Old Colony and Newport Railway Company. The road was opened over a part of the route June 15, and through August 18. This road runs no freight trains.
- ⁷ The Fall River, Warren and Providence road(19) hire their equipments; they carry no freight.
- ⁸ The books and papers of the Fitchburg road having been destroyed by fire, no return is made of the tons of freight carried.
- ⁹ The Framingham and Lowell road(21) had not commenced business September 30; their equipment was not then complete.
- ¹⁰ The Hanover Branch(22) runs no freight trains.
- ¹¹ The return of the Hartford and New Haven road is for ten months only.
- ¹² The Horn Pond Branch(24), Lowell and Lawrence(26), and Salem and Lowell(42) roads, are operated by the Boston and Lowell Railroad Company.
- ¹³ The Mansfield and Framingham road(27) is operated by the Boston, Clinton and Fitchburg road, and owns no equipment.
- ¹⁴ The Milford and Woonsocket(30) road is equipped and operated by the Providence and Worcester Railroad Company.
- ¹⁵ The Monadnock road(31) has been in operation but a short time; the return is, therefore, incomplete. No separate freight trains are run.
- ¹⁶ The balance sheet of the New London Northern road(37) was made up December 1, 1870. No return is made of cost and equipment.
- ¹⁷ The Pittsfield and North Adams road(40) is operated by the Boston and Albany Railroad Company.
- ¹⁸ The South Reading Branch road(43) owns no equipment, it being furnished by the Eastern Railroad Company.
- ¹⁹ The Stony Brook road(46) is equipped and operated by the Nashua and Lowell Railroad Company.
- ²⁰ The Stoughton Branch road(47) is operated partly by the Boston and Providence Railroad Company.
- ²¹ A portion of the Ware River road(50) is equipped and operated by the New London Northern Railroad Company. The remainder is not in operation.

NOTE.—The figures in parentheses correspond with the marginal numbers of the roads in the several tables.

TABULATED COMPARATIVE RESULTS

OF THE

CONDITION AND OPERATION

OF THE SEVERAL

RAILROAD CORPORATIONS OF THE STATE.

COMPILED FROM REPORTS.

CONTENTS OF COMPARATIVE TABLES.

JJ. STOCK INDEBTEDNESS AND COST OF ROAD. AVERAGE PER MILE OWNED BY COMPANY.

- 78. Authorized by Charter.
- 79. Authorized by Votes of Company.
- 80. Paid in.
- 81. Debt per mile owned.

COST AND EQUIPMENT PER MILE OWNED.

- 82. Cost.
- 83. Equipment.
- 84. Cost and Equipment.
- 85. Locomotives and Snow-Plows.
- 86. Passenger, Mail and Baggage Cars.
- 87. Freight and other Cars.

KK. EARNINGS PER MILE OPERATED.

- 88. Passengers.
- 89. Freight.
- 90. Rents.
- 91. Mails.
- 92. Express.
- 93. Total.
- 94. Net.

LL. EXPENSES PER MILE OPERATED, AND PER TRAIN MILE.

- 95. Repairs.
- 96. Fuel.
- 97. Oil and Waste.
- 98. Salaries and Wages.
- 99. Gratuities and Damages.
- 100. Rents.
- 101. Total.

MM. AVERAGE RATES OF FARES AND FREIGHTS CHARGED PER MILE, AND AVERAGE DISTANCE TRAVELLED.

- 102. Each Passenger, not including Season Tickets.
- 103. Each Passenger, to and from other Roads.
- 104. Each Passenger, Season Tickets.
- 105. Each Ton of Freight.
- 106. Each Ton of Freight to and from other Roads.
- 107. Average Distance travelled by each Passenger.
- 108. Average Distance travelled by each Ton of Freight.

NN. PASSENGERS AND FREIGHT CARRIED PER MILE OF ROAD OPERATED.

- 109. Passengers, Local.
- 110. Passengers to and from other States.
- 111. Passengers, Total.
- 112. Freight, Local.
- 113. Freight to and from other States.
- 114. Freight, Total.

OO. AVERAGE NUMBER OF CARS IN TRAINS, AVERAGE WEIGHT OF TRAINS, ETC.

- 115. Average Number of Passenger Cars in Trains.
- 116. Average Number of Freight Cars in Trains.
- 117. Average Weight of Passenger Trains.
- 118. Average Weight of Freight Trains.
- 119. Dead Weight of Passenger Trains carried One Mile.
- 120. Dead Weight of Freight Trains carried One Mile.
- 121. Dead Weight hauled One Mile to each Passenger.
- 122. Dead Weight hauled One Mile to each Ton of Freight.

PP. ROLLING STOCK PER MILE OPERATED.

- 123. Number of Locomotives and Tenders.
- 124. Number of Passenger Cars.
- 125. Number of Freight Cars.
- 126. Number of Baggage Cars.
- 127. Number of other Cars.

Tabulated Comparative Results, compiled from the Returns of the several Railroad Corporations in Massachusetts, for the year ending September 30, 1871.

Number.	NAME OF CORPORATION.	STOCK, INDEBTEDNESS, COST OF ROAD, &c.				Cost and Equipment.		
		Stock.		S1.—Debt.	S2.—Cost.	S3.—Equip-ment.	S4.—Cost and Equipment.	
		S7.—Author-ized by Charter.	S9.—Author-ized by Votes of Co.					
			S8.—Paid in.					
1	Athol and Enfield, .	\$23,026 32	\$16,447 37	\$3,000 00	\$24,013 16	-	-	-
2	Attleborough Branch, .	33,591 73	33,385 01	-	-	-	-	-
3	Berkshire, .	37,860 86	28,395 65	6,896 21	23,663 04	-	\$15,368 10	\$91,690 90
4	Boston and Albany, .	109,462 00	78,772 98	85 54	26,355 72	1,202 44	1,202 44	27,558 16
5	Boston, Barre and Gardner, .	42,771 60	29,257 00	24,620 11	28,493 59	12,798 62	41,292 21	65,513 71
6	Boston, Clinton and Fitchburg, .	35,078 14	20,354 56	38,728 39	60,986 66	4,527 05	10,654 91	63,781 86
8	Boston and Lowell, .	83,456 79	55,135 80	2,296 07	53,126 95	3,545 30	2,405 18	16,505 99
9	Boston and Maine, .	84,592 14	59,471 59	-	62,166 06	6,557 25	50,154 92	39,503 21
10	Boston and Providence, .	68,376 08	67,521 37	3,604 60	14,100 81	4,228 41	-	-
11	Cape Cod, .	19,602 72	17,809 72	15,095 11	43,597 67	-	-	-
12	Cheshire, .	40,158 52	40,158 52	7,034 04	35,274 80	-	-	-
13	Connecticut River, .	41,398 34	31,278 75	16,216 21	26,427 68	-	-	-
14	Danvers, .	10,810 81	7,297 30	17,984 02	41,960 85	-	-	-
15	Dorchester and Milton, .	40,000 00	22,566 16	-	17,737 57	-	-	-
16	Duxbury and Cohasset, .	25,714 27	20,000 00	41,896 24	57,437 45	15,112 52	72,549 97	-
17	Eastern, .	62,449 31	45,620 44	81,624 75	-	-	-	-
18	Essex Branch, .	36,363 64	13,636 36	25,906 74	57,098 08	6,000 85	42,863 26	35,141 12
19	Fall River, Warren and Providence, .	25,906 74	25,906 74	22,238 75	30,680 12	4,461 00	26,866 49	68,792 07
20	Fitchburg, .	42,863 26	42,863 26	6,353 24	22,158 74	4,707 75	10,256 40	-
21	Framingham and Lowell, .	57,692 00	19,231 00	9,666 67	58,535 67	-	-	-
22	Hanover Branch, .	20,330 37	15,667 09	-	-	-	-	-
23	Hartford and New Haven, .	83,333 33	64,102 56	-	-	-	-	-

24	Horn Pond Branch,	\$61,538 46	\$15,384 61	\$3,076 92	-	\$20,116 18	-	-
25	Holyoke and Westfield,	34,046 69	19,455 25	19,455 25	\$19,455 25	32,776 77	-	-
26	Lowell and Lawrence,	24,291 50	16,194 34	16,194 34	5,400 81	26,954 08	\$2,451 44	\$29,405 52
27	Mansfield and Framingham,	26,086 95	13,043 48	12,642 00	19,252 73	32,876 00	-	-
29	Middleborough and Taunton,	17,564 40	17,564 40	17,339 00	964 31	15,798 62	4,693 65	20,492 27
30	Milford and Woonsocket,	25,773 20	21,262 89	21,250 00	7,603 09	30,852 02	-	-
31	Monadnock,	18,987 34	15,822 78	12,500 00	6,318 05	21,490 83	841 77	22,332 60
32	Mount Tom and Easthampton,	29,411 77	14,705 88	7,647 06	-	11,611 29	-	-
33	Nashua and Lowell,	55,172 41	55,172 41	55,172 41	4,436 21	51,163 77	7,821 12	58,984 89
34	New Bedford and Taunton,	22,105 53	22,105 53	13,815 96	4,738 88	11,752 37	2,063 87	13,816 24
35	Newburyport,	15,925 93	-	8,160 74	11,111 11	22,125 42	-	-
36	New Haven and Northampton,	30,303 03	21,212 12	21,212 12	14,696 96	22,926 74	7,697 09	30,623 83
37	New London Northern,	20,000 00	9,684 00	9,684 00	7,365 00	-	-	-
38	Norwich and Worcester,	42,545 18	42,545 18	35,608 43	12,936 75	37,108 17	2,254 69	39,362 86
39	Old Colony and Newport,	44,590 80	-	34,300 75	21,834 75	48,928 16	5,429 45	54,357 61
40	Pittsfield and North Adams,	26,809 65	24,128 69	24,128 69	-	23,187 00	603 08	23,790 08
41	Providence and Worcester,	67,552 35	67,552 35	45,034 90	7,318 17	37,300 29	12,953 93	50,254 22
42	Salem and Lowell,	23,696 68	14,413 50	14,413 50	13,441 94	22,892 50	4,890 00	27,782 50
43	South Reading Branch,	36,809 82	36,809 82	25,709 54	11,723 59	36,744 59	-	-
44	South Shore,	52,173 91	-	22,581 30	13,043 48	40,188 40	3,428 37	43,616 77
45	Stockbridge and Pittsfield,	25,079 80	-	20,460 56	-	25,079 80	-	-
46	Stony Brook,	22,796 35	22,796 35	22,348 02	-	20,685 11	-	-
47	Stoughton Branch,	37,110 34	21,128 15	21,128 15	1,731 82	25,913 16	4,255 31	30,168 47
48	Taunton Branch,	22,842 64	22,842 64	22,842 64	3,314 32	26,224 89	4,133 75	30,358 64
49	Vermont and Massachusetts,	39,955 07	35,700 91	35,700 91	11,730 52	40,479 26	3,402 00	43,881 26
50	Ware River,	20,366 60	19,348 28	9,997 97	9,409 37	18,166 16	-	-
51	West Stockbridge,	27,272 73	-	14,400 00	-	14,400 00	-	-
52	Worcester and Nashua,	45,961 92	33,053 18	31,197 20	4,377 32	39,018 34	5,656 02	44,674 36
	Average,	\$55,000 00	\$43,000 00	\$37,000 00	-	\$46,000 00	\$6,400 00	\$53,000 00

NOTE.—Numbers 7 and 28, included in other returns, or not received. See notes, p. 320.

Tabulated Comparative Results, compiled from Returns of Railroad Corporations—Continued.

Number.	NAME OF CORPORATION.	JJ.—STOCK, INDEBTEDNESS, &c.—Con.			KK. EARNINGS, PER MILE OF ROAD OPERATED.			
		Cost and Equipment.			Gross.			
		85.—Locomotives and Snow-Plows.	86.—Passenger, Mail and Baggage Cars.	87.—Freight and other Cars.	88.—Passengers.	89.—Freight.	90.—Rents.	91.—Mails.
3	Berkshire,	—	—	—	\$1,735 87	\$3,788 42	\$2,000 00	\$91 06
4	Boston and Albany,	\$4,606 30	\$1,373 24	\$6,460 23	10,348 91	17,694 87	708 51	272 80
5	Boston, Barre and Gardner,	493 28	248 08	408 13	55 55	5 50	111 81	—
6	Boston, Clinton and Fitchburg,	3,711 15	2,330 84	6,494 05	2,575 03	3,339 11	80 00	58 07
7	Boston, Hartford and Erie,	—	—	—	2,146 80	2,422 88	—	21 26
8	Boston and Lowell,	2,291 40	844 56	1,391 08	5,981 81	7,354 95	—	74 35
9	Boston and Maine,	3,695 17	1,701 35	3,663 24	7,679 60	5,408 62	201 53	288 25
10	Boston and Providence,	1,800 00	753 85	991 46	11,451 40	9,085 66	186 44	92 41
11	Cape Cod,	921 93	462 41	563 45	2,557 52	921 51	260 85	179 20
12	Cheshire,	2,582 42	465 72	2,962 05	2,542 66	6,029 41	—	85 23
13	Connecticut River,	1,723 37	950 60	1,554 43	5,877 87	6,931 03	185 30	111 80
16	Duxbury and Cohasset	—	—	—	443 69	44 75	—	—
17	Eastern,	5,731 79	3,134 89	3,489 45	11,000 82	4,252 58	69 45	118 38
19	Fall River, Warren and Providence,	—	—	—	5,323 77	161 10	—	45 31
20	Fitchburg,	1,607 37	375 05	1,875 27	5,466 42	8,099 41	261 08	103 69
21	Framingham and Lowell,	615 38	—	3,846 15	—	—	—	—
22	Hanover Branch,	1,588 31	2,166 49	953 00	4,305 45	2,034 91	—	16 90
23	Hartford and New Haven,	—	—	—	10,725 95	9,466 98	137 45	275 11
26	Lowell and Lawrence,	1,226 98	566 85	657 60	—	—	1,837 09	—
29	Middleborough and Taunton,	896 52	594 55	3,177 64	1,479 41	2,542 04	28 19	55 65
30	Milford and Woonsocket,	—	—	—	—	—	1,289 66	—
31	Monadnock,	696 20	—	145 57	—	—	—	—
33	Nashua and Lowell,	3,655 17	1,331 00	2,834 90	5,510 70	6,775 70	63 45	68 50

34	New Bedford and Taunton,	•	•	•	\$532 10	\$421 39	\$485 63	\$4,336 77	\$2,578 20	\$12 99	\$90 68
36	New Haven and Northampton,	•	•	•	2,046 15	700 84	2,345 69	1,923 56	3,381 64	12 87	75 92
37	New London Northern,	•	•	•	—	—	—	1,860 56	2,283 84	67 33	78 14
38	Norwich and Worcester,	•	•	•	1,137 66	474 77	642 26	3,579 79	7,165 73	9 25	45 18
39	Old Colony and Newport,	•	•	•	1,907 18	1,071 15	1,527 51	7,001 26	3,607 14	232 88	112 24
40	Pittsfield and North Adams,	•	•	•	375 33	227 75	—	—	—	—	—
41	Providence and Worcester,	•	•	•	4,261 86	1,759 06	6,538 10	7,298 42	9,829 98	72 38	82 05
42	Salem and Lowell,	•	•	•	1,300 27	439 61	3,150 13	—	—	909 20	—
43	South Reading Branch,	•	•	•	—	—	—	696 76	943 42	—	—
44	South Shore,	•	•	•	1,356 56	1,480 57	591 24	5,439 03	1,399 20	38 25	119 45
45	Stockbridge and Pittsfield,	•	•	•	—	—	—	—	—	1,427 68	—
47	Stoughton Branch,	•	•	•	2,102 92	2,152 40	—	2,943 81	1,684 00	—	49 42
48	Taunton Branch,	•	•	•	1,975 40	984 56	1,173 79	4,082 77	3,051 05	310 09	76 14
49	Vermont and Massachusetts,	•	•	•	1,310 70	499 31	1,591 98	2,226 33	2,893 34	977 27	103 55
51	West Stockbridge,	•	•	•	—	—	—	—	—	—	—
52	Worcester and Nashua,	•	•	•	1,890 23	499 83	2,587 47	4,197 81	7,872 98	—	101 22

NOTE.—Numbers 1, 2, 14, 15, 18, 24, 25, 27, 28, 32, 35, 46 and 50, included in other returns, or not received. See notes, p. 320.

Tabulated Comparative Results, compiled from Returns of Railroad Corporations—Continued.

Number.	NAME OF CORPORATION.	KK.—EARNINGS, PER MILE OF ROAD—Con.			LL.—EXPENSES.			
		Gross.		94.—Net from all sources.	95.—Repairs.		96.—Fuel.	
		92.—Express.	93.—Total.		Per mile operated.	Per train mle.	Per mile operated.	Per train mle.
3	Berkshire,	\$83 33	\$7,698 68	\$2,000 00	—	—	—	—
4	Boston and Albany,	654 13	29,679 22	8,032 96	\$8,805 56	\$0 58.	\$2,765 13	\$0 18.10
5	Boston, Barre and Gardner,	—	172 86	134 06	—	—	—	—
6	Boston, Clinton and Fitchburg,	72 00	6,124 21	1,100 27	1,492 72	36.90	1,093 57	27.
7	Boston, Hartford and Erie,	8 04	4,598 98	1,078 36	1,524 13	36.95	636 14	15.42
8	Boston and Lowell,	217 22	13,828 33	2,850 45	3,262 94	43.25	1,307 96	17.33
9	Boston and Maine,	274 00	13,852 00	3,986 92	3,515 25	46.30	1,287 27	17.
10	Boston and Providence,	469 51	21,285 42	6,473 10	4,523 10	51.24	1,501 42	17.
11	Cape Cod,	118 15	4,037 23	1,005 89	1,630 05	72.62	276 35	12.35
12	Cheshire,	295 14	8,952 44	1,791 47	2,222 97	33.37	1,359 36	20.40
13	Connecticut River,	240 67	13,346 67	3,664 35	3,405 75	62.25	894 44	16.40
16	Duxbury and Cohasset,	4 55	492 99	40 93	—	—	—	—
17	Eastern,	807 03	16,245 26	5,515 31	4,142 23	41.40	1,296 36	12.96
19	Fall River, Warren and Providence,	189 07	5,719 25	1,702 87	1,408 10	73.14	113 49	5.90
20	Fitchburg,	292 94	14,223 54	3,394 11	4,158 89	58.27	1,165 64	16.33
22	Hanover Branch,	703 21	7,060 47	2,393 48	414 32	19.15	214 08	9.90
23	Hartford and New Haven,	525 20	21,130 69	7,656 82	6,226 12	78.61	1,102 54	13.92
26	Lowell and Lawrence,	—	1,837 09	1,568 40	—	—	—	—
27	Mansfield and Framingham,	—	—	1,186 91	—	—	—	—
29	Middleborough and Taunton,	—	4,105 29	817 88	1,247 25	49.86	376 56	14.59
30	Milford and Woonsocket,	—	1,289 66	350 69	637 00	—	—	—
33	Nashua and Lowell,	200 11	12,618 46	2,372 90	3,014 16	43.37	1,204 95	17.33
34	New Bedford and Taunton,	121 97	7,140 61	1,452 31	1,797 81	50.62	448 84	12.60

36	New Haven and Northampton,	•	•	\$122 71	\$5,516 70	\$1,520 20	\$1,911 00	\$0 55.60	\$390 09	\$0 11.33
37	New London Northern, . . .	•	•	85 32	4,375 19	1,203 45	1,122 83	35.	487 84	15.20
38	Norwich and Worcester, . . .	•	•	481 93	11,281 88	3,941 97	3,138 23	51.70	817 81	13.50
39	Old Colony and Newport, . .	•	•	513 03	11,466 55	4,110 83	2,355 96	34.70	786 87	11.58
41	Providence and Worcester, . .	•	•	253 03	17,535 86	4,352 41	5,053 10	52.55	1,302 13	13.54
42	Salem and Lowell, . . .	•	•	-	909 20	863 83	-	-	-	-
43	South Reading Branch, . . .	•	•	-	1,640 18	-	966 37	31.45	336 00	12.56
44	South Shore, . . .	•	•	184 37	7,180 30	1,423 21	2,317 16	48.60	766 74	16.
45	Stockbridge and Pittsfield, . .	•	•	-	1,427 68	1,427 68	-	-	-	-
46	Stony Brook, . . .	•	•	-	-	1,287 39	-	-	-	-
47	Stoughton Branch, . . .	•	•	113 51	4,790 74	1,003 42	403 89	10.	306 45	7.57
48	Taunton Branch, . . .	•	•	-	7,550 05	2,163 49	1,450 02	32.53	866 89	19.40
49	Vermont and Massachusetts, . .	•	•	188 56	6,389 05	1,850 75	1,497 98	53.35	446 37	15.90
50	Ware River, . . .	•	•	-	-	332 28	-	-	-	-
51	West Stockbridge, . . .	•	•	-	684 16	542 90	1,132 95	1 66.	-	-
52	Worcester and Nashua, . . .	•	•	298 20	12,470 00	3,962 94	2,695 36	39.16	1,272 46	18.49
Average,		•	•	-	\$14,342 06	\$4,039 38	-	-	-	-

NOTE.—Numbers 1, 2, 14, 15, 18, 21, 24, 25, 28, 31, 32, 35 and 40, included in other returns, or not received. See notes, p. 320.

Tabulated Comparative Results, compiled from Returns of Railroad Corporations—Continued.

Number.	NAME OF CORPORATION.	LL.—EXPENSES—Con.					
		97.—Oil and Waste.		98.—Salaries and Wages.		99.—Gratuities and Damages.	
		Per mile operated.	Per train mile.	Per mile operated.	Per train mile.	Per mile operated.	Per train mile.
4	Boston and Albany,	\$328 94	\$0 02.15	\$5,813 96	\$0 38.09	\$105 64	\$0 00.69
5	Boston, Barre and Gardner,	—	—	—	—	—	—
6	Boston, Clinton and Fitchburg,	106 53	2.62	1,417 21	35 00	36 30	.90
7	Boston, Hartford and Erie,	51 93	1.25	1,324 42	32.11	42 07	1.02
8	Boston and Lowell,	210 70	2.75	2,659 98	35.25	92 63	1.22
9	Boston and Maine,	142 40	1.90	2,430 37	32.	80 41	1.06
10	Boston and Providence,	224 93	2.55	4,261 38	48 27	93 00	1.05
11	Cape Cod,	36 01	1 60	460 00	20.50	18 16	.80
12	Cheshire,	159 89	2 40	1,319 65	19.80	39 08	.58
13	Connecticut River,	108 25	2.	2,116 33	38.68	76 04	1.39
16	Duxbury and Cohasset,	—	—	280 13	83.13	1 23	1.36
17	Eastern,	128 07	1.28	3,254 48	32.53	148 20	1.48
19	Fall River, Warren and Providence,	116 74	6.06	1,668 41	86 67	—	—
20	Fitchburg,	110 52	1.55	2,522 56	35.34	92 01	1.29
22	Hanover Branch,	28 94	1.34	761 13	35 18	—	—
23	Hartford and New Haven,	113 82	1.44	384 28	48.52	—	—
29	Middleborough and Taunton,	26 68	1.06	1,101 41	44.04	10 99	.44
33	Nashua and Lowell,	200 24	2.88	2,437 98	35.08	85 34	1.23
34	New Bedford and Taunton,	95 04	2.67	1,329 67	37.50	55 37	1.50
36	New Haven and Northampton,	84 89	2.50	1,212 08	35.25	37 41	1.09
37	New London Northern,	69 29	2.17	852 79	26.50	43 07	1.33
38	Norwich and Worcester,	89 03	1.47	2,103 91	34.67	87 24	1.44
39	Old Colony and Newport,	101 38	1.50	1,727 88	25.42	22 46	.33

41	Providence and Worcester,	•	•	•	\$228 57	\$0 02.37	\$3,887 56	\$0 40.40	\$11 66	\$0 00.12
43	South Reading Branch,	•	•	•	36 73	1.20	718 77	23.40	-	-
44	South Shore,	•	•	•	120 34	2.52	1,596 22	33.50	8 18	.17
47	Stoughton Branch,	•	•	•	165 23	4.08	551 40	13.62	-	-
48	Taunton Branch,	•	•	•	115 12	2.58	1,696 00	38.12	46 13	1.
49	Vermont and Massachusetts,	•	•	•	46 08	1.64	936 51	33.35	361 38	12.90
52	Worcester and Nashua,	•	•	•	85 89	1.25	2,147 00	31.20	77 49	1.12
	Average,	•	•	•	-	-	-	-	-	-

NOTE.—Numbers 1, 2, 3, 14, 15, 18, 21, 24, 25, 26, 27, 28, 30, 31, 32, 35, 40, 42, 45, 46, 50 and 51, included in other returns, or not received. See notes, p. 320.

Tabulated Comparative Results, compiled from Returns of Railroad Corporations—Continued.

Number.	NAME OF CORPORATION.	M.M.—EXPENSES—CON.			M.M.			AVERAGE RATES PER MILE OPERATED.		
		100.—Rents.		Per train mile.	101.—Total.		Passengers, each—			
		Per mile operated.	Per train mile.		Per mille operated.	Per train mile.	102.—Not in- cluding season tickets.	103.—To and from other roads.	104.—Season tickets two pas- sages per day.	
3	Berkshire,	-	-	\$5,011 24	-	\$1 24 ¹	\$0 03.18	\$0 02.79	-	\$0 01.02
4	Boston and Albany,	-	-	18,962 87	-	-	3.00	2.36	-	-
5	Boston, Barre and Gardner,	-	-	53 22	-	1 24 ¹	-	2.25	2.25	.50
6	Boston, Clinton and Fitchburg,	\$373 35	\$0 09.20	5,023 79	1 24 ¹	2.45	3.25	2.65	2.65	1.08
7	Boston, Hartford and Erie,	-	-	4,434 40	1 07	1.97	2.71	1.97	1.97	1.01
8	Boston and Lowell,	649 69	8.60	10,777 89	1 42 ⁴	1.75	2.98	2.17	1.75	.87
9	Boston and Maine,	52 08	.70	9,865 09	1 30	3.00	3.72	2.99	2.99	1.23
10	Boston and Providence,	56 82	.64	14,812 33	1 67 ³	3.20	3.60	3.20	3.20	.40
11	Cape Cod,	-	-	3,031 34	1 35	3.36	3.20	3.50	-	.77
12	Cheshire,	579 54	8.70	7,151 22	1 07 ⁵	2.13	2.93	2.93	2.93	1.14
13	Connecticut River,	-	-	9,682 32	1 77	7.00	6.00	2.13	2.13	.90
16	Duxbury and Cohasset,	-	-	-	-	2.22	2.66	3.25	3.25	.90
17	Eastern,	27 90	.28	10,732 95	1 07 ¹	3.10	3.10	2.80	2.80	1.12
19	Fall River, Warren and Providence,	-	-	4,016 30	2 08 ⁵	-	-	-	-	.70
20	Fitchburg,	256 99	3.60	10,829 44	1 51 ³	4.36	4.36	5.11	5.11	.84
22	Hanover Branch,	2,888 20	1 33.50	4,669 63	2 15 ³	5.25	5.25	4.00	4.00	-
23	Hartford and New Haven,	-	-	13,473 89	1 70	1.97	2.70	2.56	2.56	1.
26	Lowell and Lawrence,	-	-	263 68	-	3.21	3.21	-	-	.69
29	Middleborough and Taunton,	-	-	3,301 34	1 31 ⁴	-	-	-	-	-
31	Monadnock,	-	-	-	-	-	-	-	-	-
33	Nashua and Lowell,	920 70	13.25	10,245 56	1 47 ⁴	1.97	2.70	2.56	2.56	1.
34	New Bedford and Taunton,	-	-	5,688 30	1 60	2.70	2.70	2.56	2.56	.69
36	New Haven and Northampton,	-	-	3,996 91	1 16 ⁸	-	-	-	-	-

37	New London Northern, . . .	.	.	\$3,171 75	\$0 99	\$0 03.50	\$0 02.50	\$0 00.99
38	Norwich and Worcester, . .	.	.	7,339 92	1 21	3.41	3.33	.90
39	Old Colony and Newport, . .	.	.	7,355 71	1 08 ¹ / ₂	2 72	1.62	1.03
41	Providence and Worcester, . .	\$105 74	\$0 01.10	13,183 46	1 37 ¹ / ₂	2 83	2.78	.78
43	South Reading Branch, . . .	392 64	12.75	2,500 53	81 ³ / ₄	4 39	5.85	1.41
44	South Shore, . . .	.	.	5,757 09	1 20 ¹ / ₂	3 99	3.43	1.52
45	Stockbridge and Pittsfield, . .	.	.	5,103 20	2 01 ³ / ₄	3 18	2.79	.
47	Stoughton Branch, . . .	1,073 47	26.50	3,785 41	93 ⁵ / ₁₆	6 20	3.44	1.72
48	Taunton Branch, . . .	.	.	5,386 56	1 20 ¹ / ₂	3 33	3.20	.75
49	Vermont and Massachusetts, . .	172 60	6.15	4,538 82	1 61 ³ / ₄	3 97	3.83	.
52	Worcester and Nashua, . . .	.	.	8,507 28	1 23 ³ / ₈	3 24	2.90	.90
	Average, . . .	.	.	\$9,598 41	\$1 32 ³ / ₁₀	-	-	-

NOTE.—Numbers 1, 2, 14, 15, 18, 21, 24, 25, 27, 28, 30, 32, 35, 40, 42, 46, 50 and 51, included in other returns, or not received. See notes, p 320.

¹ Upon p. 90 of the Report, the cost per train mile of the Boston, Hartford and Erie road was stated as \$0.83, instead of \$1.07, and that of the Boston & Albany road as \$1.42, instead of \$1.24. These, and numerous other errors of calculation in the Tabulated Results, as prepared for the Commissioners, were detected as the final pages of this Report were passing through the press. The entire tables were in consequence revised and verified, and the figures in them, as they now stand, are believed to be correct.

Tabulated Comparative Results, compiled from Returns of Railroad Corporations—Continued.

Number.	NAME OF CORPORATION.	MM.—AVERAGE RATES PER MILE OPERATED—Con.				NN.—PASSENGERS AND FREIGHT CARRIED PER MILE OPERATED.		
		Freight.		Av'ge Distance Travelled, Miles.		Passengers.		111.—Total.
		105.—Per ton.	106.—Per ton to and from other Roads.	107.—Passengers, each.	108.—Freight each ton.	109.—Local.*	110.—To and from other States.*	
3	Berkshire,	\$0 03 25	—	8.38	16.	1,115	2,279	3,394
4	Boston and Albany,	3.02	\$0 01.76	20.79	102.87	16,309	1,377	17,686
6	Boston, Clinton and Fitchburg,	5.50	2.25	20.	—	4,009	—	4,009
7	Boston, Hartford and Erie,	4.50	2.	9.16	27.28	13,135	896	14,031
8	Boston and Lowell,	4.11	2.55	13.30	28.71	17,640	2,337	19,977
9	Boston and Maine,	2.85	2.40	14.37	38.16	22,802	4,098	26,900
10	Boston and Providence,	4.88	2.90	11.78	29.78	34,225	5,518	39,743
11	Cape Cod,	3.39	3.91	24.24	29.95	3,396	80	3,476
12	Cheshire,	2.21	2.	39.07	55.78	733	988	1,671
13	Connecticut River,	5.69	3.54	11.92	24.89	13,937	—	16,126
16	Duxbury and Cohasset,	5.90	4.60	7.69	11.32	1,608	—	1,608
17	Eastern,	3.51	2.76	13.	28.	38,102	1,921	40,023
19	Fall River, Warren and Providence,	—	—	5.79	—	—	14,176	14,176
20	Fitchburg,	—	—	12.66	—	19,075	141	19,216
22	Hanover Branch,	8.	8.	4.	4.	8,469	—	8,469
23	Hartford and New Haven,	3.60	2.70	27.97	42.26	—	—	15,581
29	Middleborough and Taunton,	10.	12.68	6.99	5.41	4,170	—	4,170
31	Monadnock,	22.	8.	4.06	3.25	—	—	—
33	Nashua and Lowell,	4.11	2.55	13.30	28.71	16,251	2,153	18,404
34	New Bedford and Taunton,	7.30	6.41	13.41	10.03	8,984	—	8,984
36	New Haven and Northampton,	4.30	—	14.72	39.05	1,434	285	1,719
37	New London Northern,	4.80	2.90	14.61	31.95	—	—	3,786
38	Norwich and Worcester,	3.80	4.30	18.74	38.72	—	—	5,597

39	Old Colony and Newport,	.	.	\$0	05.65	\$0	03.67	13.63	27.45	21,345	1,518	22,863
41	Providence and Worcester,	.	.	.	3.35	.	2.30	9.19	30.63	-	-	29,583
43	South Reading Branch,	.	.	.	-	.	-	6.27	3.52	3,147	-	3,147
44	South Shore,	.	.	.	1.08	.	.88	5.14	6.03	34,201	-	34,201
45	Stockbridge and Pittsfield,	.	.	.	3.25	.	-	11.86	11.	-	-	4,189
47	Stoughton Branch,	.	.	.	4.50	.	-	2.54	-	-	-	30,738
48	Taunton Branch,	.	.	.	6.	.	4.02	10.53	10.90	12,027	-	12,027
49	Vermont and Massachusetts,	.	.	.	7.80	.	7.33	20.47	21.67	2,782	-	2,782
52	Worcester and Nashua,	.	.	.	2.24	.	1.95	16.80	35.60	-	-	7,797
	Average,	.	.	.	-	.	-	14.70	50.10	-	-	-

NOTE.—Numbers 1, 2, 5, 14, 15, 18, 21, 24, 25, 26, 27, 28, 30, 32, 35, 40, 42, 46, 50 and 51, included in other returns, or not received.
See notes, p. 320.

* The great and obvious inaccuracy of the returns made it impracticable in most cases to tabulate results under these headings.

Tabulated Comparative Results, compiled from Returns of Railroad Corporations—Continued.

Number.	NAME OF CORPORATION.	NN.—PASSENGERS AND FREIGHT CARRIED—CON.		OO.	
		Freight, in tons.		Average No. of Cars in Train.	
		112.—Local.*	113.—To and from other States.*	115.—Passenger.	116.—Freight.
3	Berkshire,	143	7,590	2	20
4	Boston and Albany,	—	—	6	16
6	Boston, Clinton and Fitchburg,	3,218	—	2	—
7	Boston, Hartford and Erie,	1,454	990	4	19
8	Boston and Lowell,	2,760	3,441	6	30
9	Boston and Maine,	1,797	1,581	5	25
10	Boston and Providence,	2,088	6,371	6	23
11	Cape Cod,	775	—	4	8
12	Cheshire,	—	—	4	12
13	Connecticut River,	3,861	2,257	5	25
16	Duxbury and Cohasset,	46	—	3	2
17	Eastern,	2,976	202	6	25
19	Fall River, Warren and Providence,	—	—	3	—
20	Fitchburg,	—	—	5	19 ¹
22	Hanover Branch,	1,467	—	2 ¹ ₂	21 ²
23	Hartford and New Haven,	—	—	5 ¹ ₂	23
29	Middleborough and Taunton,	3,724	—	2	20
31	Monadnock,	—	—	1	—
33	Nashua and Lowell,	2,543	3,153	6	30
34	New Bedford and Taunton,	3,595	—	3	21
36	New Haven and Northampton,	159	990	—	—
37	New London Northern,	—	—	3	18
38	Norwich and Worcester,	—	—	3	22 ²

39	Old Colony and Newport,	.	.	.	.	.	.	2,427	284	2,711	6	20
41	Providence and Worcester,	.	.	.	.	.	.	—	—	9,564	4	25 ³
43	South Reading Branch,	.	.	.	.	.	.	3,462	—	3,462	1	—
44	South Shore,	.	.	.	.	.	.	2,245	—	2,245	—	—
45	Stockbridge and Pittsfield,	.	.	.	.	.	.	205	3,954	4,159	2	20
47	Stoughton Branch,	.	.	.	.	.	.	—	—	8,974	2	—
48	Taunton Branch,	.	.	.	.	.	.	6,274	—	6,274	4	—
49	Vermont and Massachusetts,	.	.	.	.	.	.	1,709	—	1,709	4 $\frac{1}{2}$	16
52	Worcester and Nashua,	.	.	.	.	.	.	—	—	7,187	6	20
	Average,	.	.	.	.	.	.	—	—	—	—	—

NOTE.—Numbers 1, 2, 5, 14, 15, 18, 21, 24, 25, 26, 27, 28, 30, 32, 35, 40, 42, 46, 50 and 51, included in other returns, or not received.
See notes, p. 320.

* The great inaccuracy of the returns made it impracticable in most cases to tabulate results under these headings.

¹ 38 18-100 four-wheel cars.

² 45 four-wheel cars.

³ 50 four-wheel cars.

Tabulated Comparative Results, compiled from Returns of Railroad Corporations—Continued.

Number.	NAME OF CORPORATION.	C.C.—WEIGHT OF TRAINS, &C.—CON.					
		Average Weight of Trains, tons.*		Dead Weight of Trains Carried one Mile.		Dead Weight Hauled One Mile, to each—	
		117.—Passenger.	118.—Freight.	119.—Passenger.	120.—Freight.	121.—Passenger.	122.—Freight.
4	Boston and Albany,	174	162	194,712,438	465,890,130	1,973	2,051
6	Boston, Clinton and Fitchburg,	92	—	15,290,676	—	2,608	—
7	Boston, Hartford and Erie,	169	174	55,486,249	32,933,154	3,439	4,104
8	Boston and Lowell,	158	256	56,428,120	79,503,104	2,399	5,044
9	Boston and Maine,	134	217	93,035,530	79,327,171	1,671	4,273
10	Boston and Providence,	169	241	63,987,625	47,631,963	2,055	2,842
11	Cape Cod,	122	96	12,296,258	6,312,096	1,907	3,553
12	Cheshire,	119	130	14,585,830	58,028,750	2,491	2,805
13	Connecticut River,	137	214	20,580,962	28,206,270	1,975	3,408
17	Eastern,	162	215	106,956,612	48,617,305	1,784	4,764
20	Fitchburg,	132	197	44,106,216	63,080,582	1,942	—
23	Hartford and New Haven,	140	204	43,348,060	45,170,700	1,274	2,172
29	Middleborough and Taunton,	69	179	950,268	1,232,594	3,822	7,161
33	Nashua and Lowell,	157	256	25,191,278	35,718,656	2,384	5,033
34	New Bedford and Taunton,	106	189	10,591,944	4,881,681	2,429	3,741
37	New London Northern,	—	154	—	20,864,228	—	2,936
38	Norwich and Worcester,	107	242	18,335,520	55,179,872	2,632	4,676
39	Old Colony and Newport,	164	183	108,925,356	52,261,872	2,392	4,818
41	Providence and Worcester,	135	300	28,136,700	67,047,600	2,188	4,839

48	Taunton Branch,	109	-	6,269,135	-	2,512	-
49	Vermont and Massachusetts,	141	157	19,645,953	14,630,830	3,919	4,489
52	Worcester and Nashua,	143	207	13,223,496	44,858,556	2,209	3,837
	Average,	-	-	-	-	2,051	2,854

NOTE.—Numbers 1, 2, 3, 5, 14, 15, 16, 18, 19, 21, 22, 24, 25, 26, 27, 28, 30, 31, 32, 35, 36, 40, 42, 43, 44, 45, 46, 47, 50 and 51, included in other returns, or not received. See notes, p. 320.

* Including locomotive and tender in working order.

† Where no mail or baggage car was included in Return, one has been added.

‡ Freight cars averaged at 7 tons each, where the number of wheels was not specified.

Tabulated Comparative Results, compiled from Returns of Railroad Corporations—Concluded.

Number.	NAME OF CORPORATION.	ROLLING STOCK PER MILE OF ROAD OPERATED.				
		123.—Number of Locomotives and Tenders.	124.—Number of Passenger Cars.	125.—Number of Freight Cars.	126.—Number of Baggage Cars.	127.—Number of other Cars.
4	Boston and Albany, . . .	0.672	0.496	11.060	0.134	2.231
5	Boston, Barre and Gardner, . . .	0.115	0.039	0.385	0.038	1.231
6	Boston, Clinton and Fitchburg, . . .	0.192	0.247	2.165	0.151	4.561
7	Boston, Hartford and Erie, . . .	0.175	0.239	0.876	0.104	2.112
8	Boston and Lowell, . . .	0.375	0.489	3.511	0.216	6.250
9	Boston and Maine, . . .	0.340	0.611	2.437	0.167	6.167
10	Boston and Providence, . . .	0.526	0.857	3.534	0.135	4.060
11	Cape Cod, . . .	0.131	0.196	0.706	0.091	1.346
12	Cheshire, . . .	0.307	0.250	2.864	0.103	1.796
13	Connecticut River, . . .	0.313	0.423	2.465	0.165	3.679
17	Eastern, . . .	0.477	0.816	2.813	0.234	5.764
20	Fitchburg, . . .	0.386	0.461	4.008	0.118	4.094
22	Hanover Branch, . . .	0.223	0.563	0.789	—	0.563
23	Hartford and New Haven, . . .	0.436	0.423	2.449	0.231	5.244
29	Middleborough and Taunton, . . .	0.117	0.234	2.577	0.117	0.820
31	Monadnock, . . .	0.063	—	—	—	0.316
33	Nashua and Lowell, . . .	0.347	0.440	3.197	0.185	5.746
34	New Bedford and Taunton, . . .	0.194	0.500	1.694	0.278	2.194
36	New Haven and Northampton, . . .	0.162	0.152	1.010	0.050	2.222
37	New London Northern, . . .	0.130	0.130	0.975	0.078	1.774
38	Norwich and Worcester, . . .	0.303	0.212	3.879	0.076	5.848
39	Old Colony and Newport, . . .	0.275	0.521	1.221	0.137	2.690
41	Providence and Worcester, . . .	0.485	0.511	0.649	0.128	1.232

44	South Shore,	.	.	.	.	.	0.261	1 044	0.348	0.174	0.956
47	Stoughton Branch,	.	.	.	.	.	0.250	0.500	—	—	0.500
48	Taunton Branch,	.	.	.	.	.	0.304	0.508	2.792	0.304	2.636
49	Vermont and Massachusetts,	.	.	.	.	.	0.170	0.239	1.739	0.079	1.409
52	Worcester and Nashua,	.	.	.	.	.	0.284	0.240	4.620	0.109	3.100
	Average, . . . . .	.	.	.	.	.	0.356	0.434	3.664	0.143	3.747

NOTE.—Numbers 1, 2, 3, 14, 15, 16, 18, 19, 21, 24, 25, 26, 27, 28, 30, 32, 35, 40, 42, 43, 45, 46, 50 and 51, included in other returns, or not received. See notes, p. 320.

TABULATED STATEMENT

COMPILED FROM

STREET RAILWAY RETURNS.

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Tabulated Statement prepared from the Returns of the several Street (Horse) Railway Companies.

Number.	NAME OF COMPANY.	128.—Capital Stock paid in.	DEBT.		
			129.—Funded.	130.—Unfunded.	131.—Total.
1	Albany Street Freight,	\$75,000 00	—	\$154 80	\$154 80
2	Boston and West Roxbury, ¹	41,000 00	—	—	None.
3	Boston and Chelsea, ²	110,000 00	—	—	None.
4	Cambridge, ³	740,900 00	\$150,000 00	—	150,000 00
5	Lowell Horse,	55,830 00	—	4,500 00	4,500 00
6	Lynn and Boston,	200,000 00	50,000 00	46,718 20	96,718 20
7	Malden and Melrose, ⁴	200,000 00	—	—	None.
8	Marginal Freight, ⁵	500,000 00	500,000 00	36,325 96	536,325 96
9	Medford and Charlestown, ⁶	21,000 00	4,000 00	—	4,000 00
10	Merrimack Valley,	50,000 00	—	—	None.
11	Metropolitan,	1,250,000 00	—	455,566 07	455,566 07
12	Middlesex,	400,000 00	184,500 00	101,290 89	285,790 89
13	Northampton and Williamsburg,	300,000 00	—	5,059 42	5,059 42
14	North Woburn, ⁷	20,800 00	8,000 00	2,006 00	10,006 00
15	Salem,	150,000 00	35,900 00	3,300 00	39,200 00
16	Somerville Horse, ⁸	98,000 00	—	—	None.
17	South Boston,	450,000 00	—	—	None.
18	Springfield, ⁹	50,000 00	—	7,000 00	7,000 00
19	Stoneham,	33,000 00	—	—	None.
20	Union, ¹⁰	200,000 00	75,000 00	132,903 31	207,903 31
21	Waltham and Newton,	14,750 00	—	17,506 90	17,506 90
22	Winnisimmet, ¹¹	51,650 00	—	—	None.
23	Worcester,	40,000 00	33,000 00	18,000 00	51,000 00
	Total,	\$5,051,930 00	\$1,040,400 00	\$830,331 55	\$1,870,731 55

NOTE.—For Notes, see end of Tables.

Tabulated Statement prepared from Returns of Street (Horse) Railway Companies—Continued.

Number.	NAME OF COMPANY.	COST AND EQUIPMENT.			
		132.—Cost.	133.—Equipment.	134.—Railways and Branches purchased.	135.—Total.
1	Albany Street Freight, .	\$48,193 04	\$516 30	—	\$48,709 34
2	Boston and West Roxbury, .	56,133 27	—	—	56,133 27
3	Boston and Chelsea, .	110,000 00	—	—	110,000 00
4	Cambridge, .	740,900 00	—	—	740,900 00
5	Lowell Horse, .	49,179 99	29,724 15	—	78,904 14
6	Lynn and Boston, .	170,832 68	106,478 48	—	277,311 16
7	Malden and Melrose, .	60,246 48	—	—	60,246 48
8	Marginal Freight, .	985,556 51	40,000 00	\$15,000 00	1,040,556 51
9	Medford and Charlestown, .	22,600 00	—	12,000 00	34,600 00
10	Merrimack Valley, .	37,000 00	26,000 00	—	63,000 00
11	Metropolitan, .	615,905 03	699,102 39	390,558 65	1,705,566 07
12	Middlesex, .	382,073 22	175,566 31	13,158 19	570,797 72
13	Northampton and Williamsburg, .	—	—	—	300,000 00
14	North Woburn, .	28,310 00	5,690 00	—	34,000 00
15	Salem, .	—	—	—	203,734 52
16	Somerville Horse, .	98,000 00	—	—	98,000 00
17	South Boston, .	171,035 96	243,376 11	—	414,412 07
18	Springfield, .	37,349 50	27,731 46	—	65,080 96
19	Stoneham, .	33,000 00	4,594 44	—	37,594 44
20	Union, .	—	395,729 61	—	395,729 61
21	Waltham and Newton, .	24,069 38	4,433 42	—	28,502 80
22	Winnisimmet, .	62,151 74	—	—	62,151 74
23	Worcester, .	20,212 93	61,200 18	—	81,413 11
	Total, .	\$2,967,549 73	\$2,605,342 85	\$430,716 84	\$6,507,343 94

Tabulated Statement prepared from Returns of Street (Horse) Railway Companies—Continued.

Number.	NAME OF COMPANY.	136.—Length of Road, including Branches, Sidings, &c.	137.—Miles Run.	138.—Number of Passengers Carried.	139.—Number of Round Trips.	140.—Rate of Speed including Stops, Miles per Hour.
1	Albany Street Freight,	.97	—	—	—	—
2	Boston and West Roxbury,	1.25	—	—	—	—
3	Boston and Chelsea,	3.43	—	—	—	—
4	Cambridge,	29.19	—	—	—	—
5	Lowell Horse,	4.03	141,751	563,901	18,409	5
6	Lynn and Boston,	11.62	493,091	2,230,056	39,803	6
7	Malden and Melrose,	3.60	—	—	—	—
8	Marginal Freight,	1.07	—	—	—	—
9	Medford and Charlestown,	3.46	—	—	—	—
10	Merrimack Valley,	5.	108,000	404,000	10,500	5
11	Metropolitan,	43.10	2,233,339	16,386,989	380,597	5 to 6
12	Middlesex,	15.60	570,442	4,030,251	105,223	5
13	Northampton and Williamsburg,	3.21	21,574	83,015	3,371	6
14	North Woburn,	2.74	18,598	72,209	3,459	8
15	Salem,	7.85	153,559	793,038	43,195	5½
16	Somerville Horse,	4.03	—	—	—	—
17	South Boston,	5.98	631,330	5,081,740	110,050	5
18	Springfield,	2.71	47,868	238,776	11,967	5½
19	Stoneham,	2.53	39,000	166,460	7,800	6
20	Union,	—	1,124,922	6,223,158	149,200	6½
21	Waltham and Newton,	2.71	26,200	118,009	4,015	7½
22	Winnisimmet,	3.25	—	—	—	—
23	Worcester,	4.16	112,295	384,493	11,170	6
	Total,	161.49	5,721,969	36,776,095	898,759	Average 5.90

Tabulated Statement prepared from Returns of Street (Horse) Railway Companies—Continued.

Number.	NAME OF COMPANY.	141.—Gross Earnings.	142.—Expense of Operating.	143.—Net Income.	144.—Expenses charged to Capital account.	145.—Assets.*	146.—Surplus.
1	Albany Street Railway,	\$2,856 50	\$2,199 09	\$657 41	-	\$27,777 07	\$1,331 61
2	Boston and West Roxbury,	2,500 00	-	-	-	-	-
3	Boston and Chelsea,	8,800 00	-	7,358 83	-	-	-
4	Cambridge,	69,091 50	-	69,091 50	-	150,000 00	-
5	Lowell Horse,	32,441 69	30,003 62	2,438 07	\$4,605 85	1,214 35	1,214 35
6	Lynn and Boston,	177,507 23	167,288 71	10,218 52	1,900 00	28,632 24	9,225 20
9	Medford and Charlestown,	2,240 00	-	1,922 73	-	2,210 21	2,210 21
10	Merrimack Valley,	32,261 93	32,261 93	-	-	-	-
11	Metropolitan,	905,065 74	751,874 10	153,191 64	79,539 65	49,729 79	121,941 79
12	Middlesex,	222,608 55	180,483 53	42,125 02	-	161,144 67	38,740 56
13	Northampton and Williamsburg,	7,887 03	7,594 41	292 62	-	-	-
14	North Woburn,	1,920 00	-	1,920 00	-	-	-
15	Salem,	47,854 08	40,229 14	7,624 94	-	-	-
16	Somerville Horse,	4,500 00	-	4,500 00	1,390 00	5,071 74	5,071 74
17	South Boston,	264,810 87	220,435 66	44,375 21	23,000 00	-	-
18	Springfield,	17,580 70	15,561 13	2,019 57	7,354 75	54,492 67	18,904 74
19	Stoneham,	14,905 77	14,557 48	348 29	-	-	-
20	Union,	467,164 77	435,491 92	31,672 85	-	323 81	323 81
21	Waltham and Newton,	7,404 15	6,647 38	756 77	-	39,105 72	14,845 75
22	Winnisimmet,	3,600 00	-	-	-	5,822 11	1
23	Worcester,	25,001 20	25,704 99	- ²	-	-	-
	Total,	\$2,318,001 71	\$1,930,333 09	\$380,513 97	\$117,790 25	\$200,000 00	\$200,000 00

NOTE.—Numbers 7 and 8, included in other returns, or not received. See notes, p. 350.

* Cash, notes receivable, accounts due, &c., as shown by balance sheet.

¹ Deficit, \$3,999.63.² Deficit, \$703.79.

Tabulated Statement prepared from Returns of Street (Horse) Railway Companies—Concluded.

Number.	NAME OF COMPANY.	147.—Interest Paid.	148.—Paid to Sinking Fund.	DIVIDENDS PAID.		151.—No. of Horses.	152.—No. of Cars.	153.—No. of other Vehicles.	154.—No. of Persons Employed.	155.—ACCIDENTS.	
				149.—Amount.	150.—Percent.					Fatal.	Not Fatal.
1	Albany Street Freight,	\$8 67	—	—	—	—	—	—	2	—	—
3	Boston and Chelsea,	—	—	\$7,480 00	6.8	—	—	—	—	—	—
4	Cambridge,	—	\$3,000 00	66,091 50	—	57	9	8	25	—	1
5	Lowell Horse,	—	—	—	—	233	35	—	102	—	5
6	Lynn and Boston,	—	1,000 00	—	—	—	—	—	3	—	—
8	Marginal Freight,	—	—	—	—	48	7	8	21	1	—
10	Merrimack Valley,	—	—	—	—	958	174	154	562	6	20
11	Metropolitan,	20,999 06	—	128,205 12	10.1	260	48	—	132	—	—
12	Middlesex,	13,609 35	4,000 00	12,000 00	3.	14	2	2	6	—	—
13	Northampton and Williamsburg,	526 76	—	—	—	7	—	—	3	—	—
14	North Woburn,	677 37	1,203 63	—	—	52	19	13	34	—	3
15	Salem,	2,353 80	—	—	—	—	—	—	—	—	—
16	Somerville Horse,	—	—	4,500 00	6.2	—	—	—	—	—	—
17	South Boston,	—	—	41,025 64	10.1	290	46	40	150	—	12
18	Springfield,	329 60	—	—	—	29	6	6	13	—	—
19	Stoneham,	400 00	—	—	—	—	4	—	8	—	—
20	Union,	6,628 22	—	20,000 00	10.	592	94	17	302	2	1
21	Waltham and Newton,	—	—	—	—	10	2	2	6	—	1
22	Winnisimmet,	—	—	2,116 00	4.	—	—	—	—	—	—
23	Worcester,	2,360 00	—	—	—	51	17	6	18	—	—
	Total,	\$47,892 83	\$9,203 63	\$281,418 26	00.	2,601	463	256	1,387	9	43

NOTE.—Numbers 2, 7 and 9, included in other returns, or not received. See notes, p. 350.

¹ And Government Tax.

² On \$75,000.

NOTES TO ABSTRACT, PREPARED FROM THE RETURNS OF STREET RAIL-
WAY COMPANIES.

- ¹ Equipped and operated by the Metropolitan(11).
- ² Equipped and operated by the Lynn and Boston(6).
- ³ Equipped and operated by the Union(20).
- ⁴ Equipped and operated by the Middlesex(12).
- ⁵ This Company is awaiting the completion of Atlantic Avenue, over which its tracks are to be laid. See note appended to report.
- ⁶ Equipped and operated by the Middlesex(12).
- ⁷ Leased to, and operated by, private parties.
- ⁸ Equipped and operated by the Union(20).
- ⁹ Return is for ten months, to September 30th.
- ¹⁰ Own no tracks; but lease those of the Cambridge(4), Arlington, and a portion of the Somerville(16).
- ¹¹ Leased to, and operated by, the Lynn and Boston(6).

TABULAR COMPARATIVE STATEMENT

COMPILED FROM

STREET RAILWAY RETURNS.

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156. Amount of Capital Stock paid in to each Mile of Road operated.
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159. Average Cost of Equipment per Mile of Single Track Railway operated.
160. Average Number of Passengers per Round Trip.
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162. Gross Earnings per Mile run.
163. Gross Earnings per Passengers carried.
164. Gross Earnings per Round Trip.
165. Expenses per Mile of Single Track Railway operated.
166. Expenses per Mile run.
167. Expenses per Passenger carried.
168. Expenses per Round Trip.
169. Cost of Repairs on Road-Bed and Track per Mile of Road operated.
170. Cost of Repairs on Cars and Harnesses and of Horseshoeing per Mile
of Road operated.
171. Cost of keeping up the Stock of Horses per Mile of Road operated.

Tabulated Comparative Statement, prepared from the several Street (Horse) Railway Companies.

Number	NAME OF COMPANY.	PER MILE OF ROAD OWNED.		155.—Average Cost per Mile of Single Track built by Company.	159.—Average Cost of Equipment per Mile of Single Track Operated.	160.—Average Number of Passengers per Round Trip.
		156.—Capital Stock paid in.	157.—Debt.			
1	Albany Street Freight,	\$77,311 34	\$159 58	\$49,683 54	\$532 26	-
2	Boston and West Roxbury,	32,800 00	-	44,906 61	-	-
3	Boston and Chelsea,	32,069 97	-	32,069 98	-	-
4	Cambridge,	25,381 98	5,138 06	25,381 98	-	-
5	Lowell Horse,	13,853 59	1,116 62	12,203 47	7,375 73	30.60
6	Lynn and Boston,	17,211 70	8,323 42	14,629 94	5,875 65	56.02
7	Malden and Melrose,	55,555 56	-	16,735 13	-	-
8	Marginal Freight,	467,289 72	501,239 21	187,249 07	771,214 95	-
9	Medford and Charlestown,	6,069 36	1,156 06	6,537 57	-	-
10	Merrimack Valley,	10,000 00	-	7,400 00	00	38.47
11	Metropolitan,	29,002 32	10,569 97	14,290 11	15,763 30	43.05
12	Middlesex,	25,641 02	18,319 65	24,491 87	7,482 36	38.30
13	Northampton and Williamsburg,	93,457 93	1,576 14	-	-	24.62
14	North Woburn,	7,591 24	3,651 82	10,329 92	2,076 64	20.87
15	Salem,	19,108 28	4,993 50	-	-	18.35
16	Somerville Horse,	24,317 61	None	24,317 61	-	-
17	South Boston,	75,250 83	None	28,599 49	32,346 61	46.17
18	Springfield,	18,450 18	2,583 02	13,782 10	10,233 01	19.95
19	Stoneham,	13,043 47	None.	13,043 47	1,815 98	21.32
20	Union,	None	None.	None	12,176 29	41.71
21	Waltham and Newton,	5,442 80	6,460 11	8,881 69	1,635 64	29.38
22	Winnisimmet,	15,892 30	None.	19,123 61	-	-
23	Worcester,	9,615 38	12,259 61	4,858 87	14,711 58	34.42
	Average,	\$28,185 32 ¹	-	\$18,530 73 ¹	\$13,089 28 ¹	40.92

¹ In averaging the "Paid-in Capital," and the "Cost per mile of single track and Equipment" of Street Railways, in order to arrive at an approximately accurate result the returns of the Marginal Freight Railway Company have been excluded, for reasons which will be apparent on reference to the report of the Directors of that Company. (Returns, pp. 363-8.)

Tabulated Comparative Statement of Street (Horse) Railway Companies—Continued.

Number.	NAME OF COMPANY.	GROSS EARNINGS.				EXPENSES.
		161.—Per Mile of Single Track Operated.	162.—Per Mile Run.	163.—Per Passenger Carried.	164.—Per Round Trip.	165.—Per Mile of Single Track Operated.
1	Albany Street Freight,	\$2,944 84	—	—	—	\$2,267 10
5	Lowell Horse, . . .	8,050 04	\$0 22 88	\$0 05.75	\$1 76	7,445 06
6	Lynn and Boston, . .	9,699 84	35 99	7.95	4 45	9,141 45
10	Merrimack Valley, . .	6,452 38	29 87	7 98	3 07	6,452 38
11	Metropolitan, . . .	20,407 34	40 52	5.51	2 37	16,953 19
12	Middlesex, . . .	9,487 23	39 02	5.52	2 11	7,691 93
13	Northampton and Williamsburg,	2,457 01	36.56	9.50	2 31	2,365 76
15	Salem, . . .	6,096 06	31 23	6 03	1 10	5,124 73
17	South Boston, . . .	35,355 25	41.94	5.21	2 40	29,430 66
18	Springfield, . . .	6,487 34	36 73	7.36	1 47	5,742 11
19	Stoneham, . . .	5,891 60	38 22	8.95	1 91	5,832 99
20	Union, . . .	14,374 30	41 52	7.56	3 13	13,399 73
21	Waltham and Newton, . .	2,732 15	28 26	6 27	1 84	2,452 90
23	Worcester, . . .	6,009 90	22 26	6 50	2 23	6,179 08
	Average, . . .	\$14,273 30	\$0 40.51	\$0 06.30	\$2 58	\$13,498 83

NOTE.—Numbers 2, 3, 4, 7, 8, 9, 14, 16 and 22, included in other returns, or not received. See notes, p. 350.

Tabular Comparative Statement of the several Street (Horse) Railway Companies—Concluded.

Number.	NAME OF COMPANY.	EXPENSES—Con.			REPAIRS PER MILE OPERATED.		
		166.—Per Mile Run.	167.—Per Passenger Carried.	168.—Per Round Trip.	169.—Road-bed and Track.	170.—Cars, &c., Harnesses and Horseshoeing.	171.—Keeping good Stock of Horses.
1	Albany Street Freight,	-	-	-	\$27 05	-	-
5	Lowell Horse,	\$0 21.17	\$0 05.32	\$1 62	215 34	\$718 25	\$496 52
6	Lynn and Boston,	33.92	7.50	4 20	863 99	979 30	338 00
10	Merrimack Valley,	29.87	7.98	3 07	321 55	544 03	-
11	Metropolitan,	33.66	4.59	1 97	2,205 40	1,157 18	429 47
12	Middlesex,	31.63	4.47	1 71	518 49	809 51	374 05
13	Northampton and Williamsburg,	35.20	9 14	2 25	29 90	109 40	121 88
14	North Woburn,	-	-	-	None.	None.	None.
15	Salem,	26 52	5.07	93	119 95	398 73	59 23
16	Somerville Horse,	-	-	-	None.	None	None.
17	South Boston,	34.91	4.33	2 00	3,835 95	1,452 83	717 12
18	Springfield,	32.50	6.51	1 30	87 56	347 66	965 31
19	Stoneham,	37.32	8.74	1 86	313 83	269 41	-
20	Union,	38.71	6.99	2 92	603 16	583 15	987 31
21	Waltham and Newton,	25.33	5 63	1 65	190 82	178 83	-
23	Worcester,	22.88	6 68	2 30	109 62	172 13	-
	Average,	\$0 33.81	\$0 05.22	\$2 16	-	-	-

NOTE.—Numbers 2, 3, 4, 7, 8, 9 and 22, included in other returns, or not received. See notes, p. 350.

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ACME
BOOKBINDING CO., INC.

APR 6 1991

100 CAMBRIDGE STREET
CHARLESTOWN, MASS

